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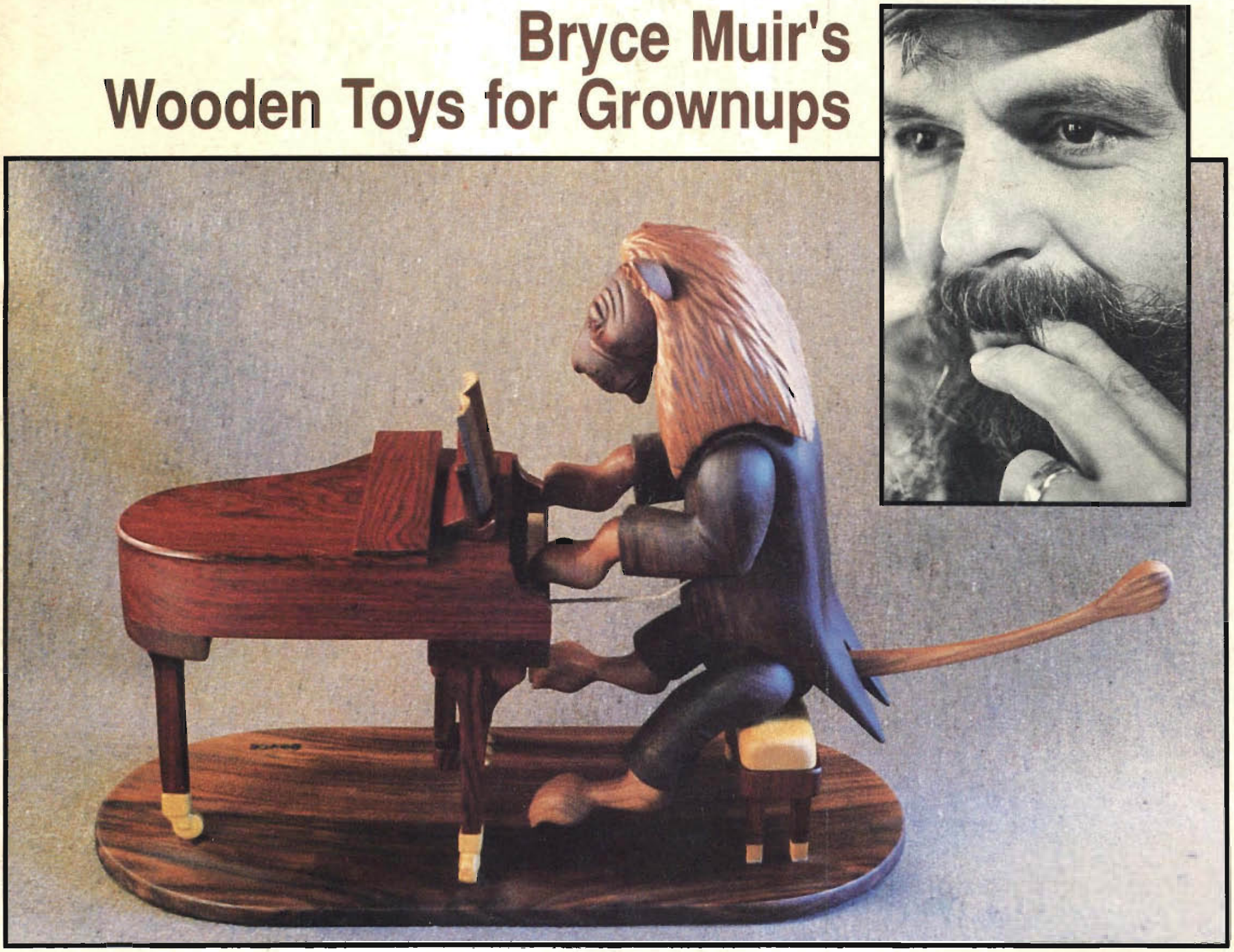

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# Popular Woodworking

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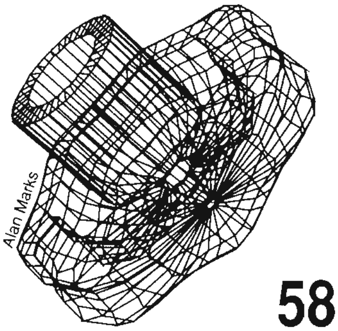

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## On the Cover

Bryce Muir makes complicated wooden toys using many different wood species for the colors in each piece. This King of Beasts sitting at the King of Instruments is one piece from a symphony orchestra that Muir is building for a client. The lion is made of redwood and his piano is rosewood. To see more of these marvelous "Toys for Grownups," turn to the story on page 34.

Ken Textor

I'll admit it, I haven't had much experience with wood finishing. I choose between either a certain brand of lacquer or a certain brand of Danish oil for my finishing needs and don't stray far from these basics. I think I've stuck with these two products that seem to "do the job" because I'm afraid to try anything else. I hear about other finishes and procedures and often feel like I'd need to be a chemist to work with them. Everybody's got his own secret formula—arrived at after years of experimentation with different materials.

But then it occurred to me that these guys aren't scientists; they're just woodworkers like me. They must have a reason for using other products, trying other concoctions. The reason is that there really are differing results from these experiments, and the differing qualities of these results work in interesting ways with different woods.

When I realized that the science of finishing wood is just one ongoing experiment—that there really is no one "right" way—it opened my mind to trying other ways myself.

So I'm learning. I'm reading about it, talking to other guys, and finding writers to share their experiments in the pages of *PW*. We'll try to run at least one article on the subject in each issue from now on. They're not intended as the final words on finishing; each is just the telling of what worked in one shop. My Beloved is shouting, "Tell them the brand names! The people want to know what did the job," so we will. When you see a brand name, it's not because they bought ad space from us but because that's what was used. The two old standbys of mine that I mentioned are Deft and Watco. If I've learned anything though, it's that everybody has a favorite.

We begin our experiments with Tom Wisshack's article "Coloring Wood." He discusses stains and dyes and "mixing your own" to get the color you want. Of course, there is always the school of thought that prefers the natural color of wood, so we follow this up with a fellow who uses different wood species as his palette, creating colorful "Toys for Grownups."

This should be interesting....

David M. Camp

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# Tricks of the Trade

*"Tricks of the Trade" shares readers' tips for making woodworking tasks easier and safer. If you've come up with a trick that would help other woodworkers, send it to "Tricks of the Trade," c/o* Popular Woodworking, *1300 Galaxy Way, Concord, CA 94520. Include any photos or sketches that help illustrate your idea (we'll redraw them). We pay $25 for each trick we publish.*

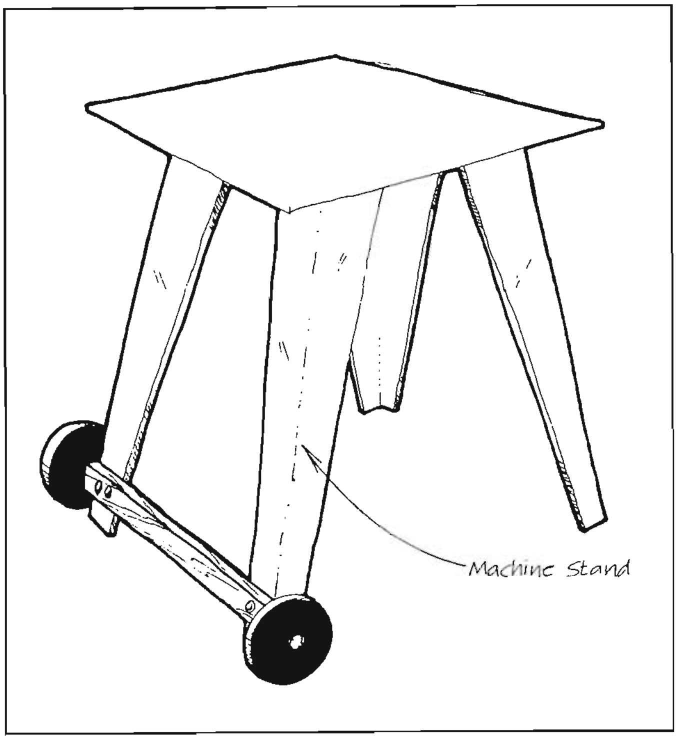
## Glue Brush Correction

In the last issue of *PW* we published a tip from John E. Leeds of Ojai, CA about his method for making glue brushes from wooden scrub brushes. In describing how to cut apart the tufts, we wrongly suggested that this be done on a table saw. Such a practice would be unsafe and difficult at best. Mr. Leeds uses a band saw, presenting the back of the brush to the blade and holding it at the appropriate angle to cut between the tufts. The thinner blade of the band saw makes it easier to avoid the metal staples, and holding on to the small pieces is not such a risky proposition. We regret the error.

Editor

## Band Saw Wheels

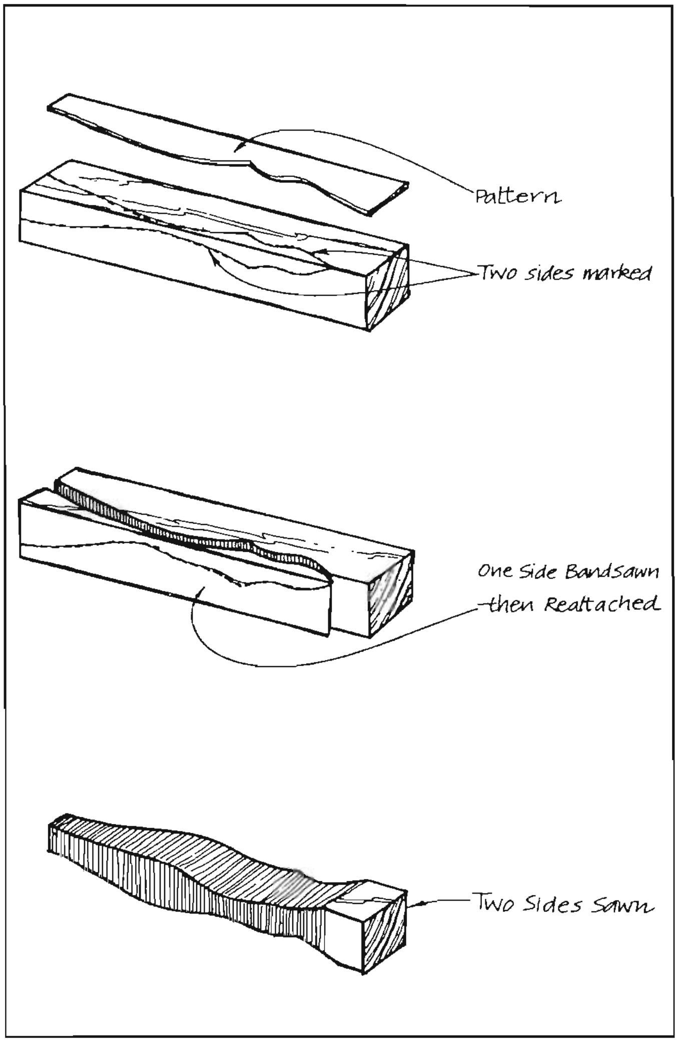
I needed to be able to move my band saw easily around my shop but have it remain stationary when I was using it, so I came up with this way of attaching wheels to it. I made a wooden axle that extends about 1/2" beyond the spread of the legs and attached some 8" wheels (cut from a scrap sink cutout) to it with lag screws. I bolted this assembly to the left side of the stand with the wheels about 1/4" off the ground. To move the machine, I tip it onto the wheels like a hand truck. Big wheels make it easier to go up a few stairs, if necessary.



W. K. Walthers
Rio Rancho, NM

## Using the Band Saw with the Lathe

Here's a great way to make duplicate parts on the lathe. Lay out the pattern on two perpendicular sides of each piece. Carefully band saw to the pattern lines on one side and then tape the sawn pieces back onto the stock with masking tape, so you can cut out the pattern on the other side. Discard the waste, and mount the stock on the lathe. When the wood is spinning, the outline of the pattern will show up as a kind of "ghost" line against the squareness of the stock. Carefully turn down the pattern. This technique works best on thicker spindles, but it can be used on any diameter.



Don Kinaman
Phoenix, AZ

## Ferrules for Tool Handles

The brass ends of the large, cartridge–type electrical fuses make great ferrules for tool handles. These large fuses are discarded by electricians, contractors, industrial plants, apartment buildings and many other establishments when they burn out. To make the ferrule, bore a 1/2" hole in the end before you cut it off. Size your tool handle to fit, and secure the ferrule with a punch mark or a small screw.

Devore O. Burch
Fort Worth, TX

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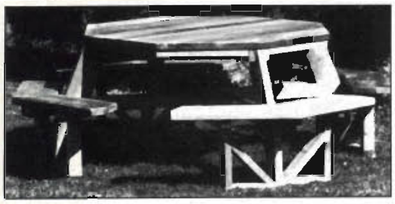

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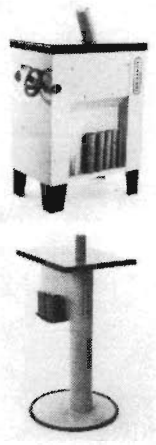

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# Book Reviews

by Hugh Foster

**John Scheeler: Bird Carver** by Roger Schroeder, ©1988 (Stackpole Books, Cameron and Kelker Streets, Harrisburg, PA 17105) 288 pp., hardcover, $49.95

This is a large, colorful, attractive book. Not a "how–to" book of the type most interesting to woodworkers, this will appeal more to lovers of "bird art" and art lovers in general. Great artists deserve homage of some sort, and the many color plates in this book indicate that John Scheeler is as worthy of homage as any sculptor who lived in America.

The book was to have been a co–written study of the advanced techniques of bird carving as practiced by Scheeler, but Scheeler died when the book was just under half finished. Author Schroeder knew that the material he had was good, so he shifted focus. Now the first two–thirds of the book are devoted to the history of bird carving and people's remembrances of John Scheeler and his work. The history of bird carving in America is interesting, and this book illuminates the interdependencies between many of the major carvers as well as their dependence upon the patronage of wealthy collectors and museums. Scheeler's memory is well served by this book. Anyone who isn't awed by his bird carvings just isn't paying attention. A few years ago I reluctantly attended an exhibit of bird art, and I remember being moved at how some of these sculptures seemed to defy even the law of gravity. Schroeder and Scheeler reveal part of the "trick" to that here. If you are a good bird carver and aspire to greatness, this book will be must reading for you, not only for the techniques presented, but for the extensive bibliography and listing of collections. Woodcarvers won't be the only people who'll want to have this handsome volume gracing their coffee tables.

**Classic Architectural Birdhouses and Feeders** by Malcolm Wells, ©1988 (Malcolm Wells, P.O. Box 1149, Brewster, MA 02631) 96 pp., paperback, $9.95 postpaid

I would normally have little interest in a book about birdhouses. The introduction to this one tells why as well as I could: most birdhouses are just six ill–fitting boards sort of nailed together. Knowing from his previous work that controversial architect Malcolm Wells has too much integrity to tell us to do that, I picked up a copy of his book. He's got lots of good plans here, but more interesting to me is his discussion about the attitude one needs when planning bird—or human—houses. He says we shouldn't be slave to fashion; too much of our architecture expresses our uncertainty. In a way, he says, anything goes. Or does it? How much artificiality should we try to foist upon ourselves and the creatures around us? The birdhouse should be our attempt to bridge the chasm between the human and the wild; Wells suggests that if we don't owe our best shot to the birds, then we owe it to the birds' Creator. He'd have us use natural materials. Never pay for more than the nails. Help keep the organic movement alive. He advises us to remember Thoreau's suggestion that "All work passes directly out of the hands of the architect into the hands of nature, to be perfected."

According to Wells, birdhouses and feeders must meet these criteria: they should be safe from attack, they should be well–ventilated and well–drained, they

---

*Hugh Foster is an English-teaching woodworker in Manitowoc, Wisconsin.*

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continued on page 12

should be easy to hang, and easy to open for inspection and cleaning. Combining all these might be more difficult for most of us than it first appears. Wells' last caveat about these projects is "Get out there and build something beautiful."

This book is hand–lettered, hand–illustrated, and hand–published. It's sold more or less only by the author. The book is as attractive—and as offbeat—as some of his birdhouses. I hope it sells well, for I trust that Wells will do interesting, organic things with his proceeds from it. Frankly, I hope he does some more books—having sampled and enjoyed his attitudes, I'd love to see a book of his home furnishings...items for standard rooms and for the home office. Whatever the topic, I look forward to sharing the next batch of ideas from one of the most profoundly individual designers of our age.

**The Woodworking Shop** by the Editors of *American Woodworker*, ©1989 (Rodale Press, 33 E. Minor St., Emmaus, PA 18049) 95 pp., paperback, $9.95

*Fine Woodworking* has been publishing anthologies like this for years, and people like me who save the magazines instead of buying these books are probably making a mistake. In the ceaseless rush of bimonthly publication, errors creep into articles almost so regularly that cynical readers are, doubtless, convinced that we put them there on purpose. When it comes time to anthologize the articles, the errors have usually been repaired. This is particularly important when we're considering project plans without double checking the math and the logic. But often when we're reading the magazines (*American Woodworker* in this case), we can pretty easily overlook the articles about tools, or we can look at them very quickly, resolving to get back to them "another day" that never comes. The 27 articles collected here treat planes and scrapers (6 articles), power tools (10 articles), maintenance and setup of tools and equipment (3 articles), useful shop–made tools (6 articles), and single pieces about dust collection, finishing, and shop safety. I found only the article about plate joiners to be superficial and out–of–date. A couple of the other articles didn't impress me when I initially read them in the magazine, but the power of the individual articles is magnified as they are brought together. The consistent attitude seems more obvious when like topics are brought together. Every magazine that's able should bring together an anthology like this one—just as often as possible.

**Make Your Own Handcrafted Doors & Windows** by John Birchard, ©1988 (Sterling Publishing Company, 2 Park Ave., New York, NY 10016) 288 pp., paperback, $14.95

*and*

**Contract Joinery** by Ken Austin, ©1988 (Linden Publishing Company, 3845 North Blackstone, Fresno, CA 93726) 169 pp., paperback, $15.95

*Contract Joinery,* first published in England in 1981, has become something of a classic in Great Britain. This text is designed to help student and apprentice craftspeople pass the exams required there. The book is about panelling, partitions, doors, windows, handrails, staircases, and even ecclesiastical projects. Each chapter includes a series of questions and answers which will aid craftspeople who are preparing to do "one–off" work. One can learn a great deal about the mathematics that underlies woodworking projects from this book; indeed, there is enough good material here that I wish I could recommend it more heartily. Unfortunately, it's written in the "castor oil" style of textbook presentation, as if to say "This is important stuff, dammit, so there's no reason to try to make it palatable." For me, this unattractive book just makes me consider Birchard's *Make Your Own Handcrafted Doors & Windows* more seriously.

Of course, all good doors and windows are made of wood, but many of us have never thought much about making these things. Just looking at the cover of Birchard's book should be enough to make us reconsider our doors and windows. In our spare time, for our own homes, we should experiment with some of the beautiful doors and windows that are explored in this handsome book. While Birchard doesn't give us as much math as does Austin, his book appears to do a better job of explaining what sorts of things have to happen around doors and windows if they are to be effective. His is the book to buy, for he will inspire you to build better doors and windows for the place where you live, even if Austin's probably gets the facts more nearly right. Since I regard woodworking as an inspired craft, I'm convinced that inspiration will do most builders more good than a bunch of very practical math. Once inspired, we'll know enough to go get the math.

**The Complete Illustrated Guide to Everything Sold in Hardware Stores** by Tom Philbin & Steve Ettlinger ©1988 (MacMillan Publishing Company, 866 Third Ave., New York, NY 10022) 432 pp., hardcover, $24.95

Steve Ettlinger got fed up with the guessing games he had to play every time he went into a hardware store asking for items he was unfamiliar with; it seemed the clerks were also unfamiliar. One day he was told by a carpenter to get a tool he had never heard of before, a "cat's paw." Sold the wrong tool by a sarcastic clerk, it took him a week to do a job that should have taken only a couple of hours with the right tool. When he failed to find a "cat's paw" listed in any of the how–to books in his extensive collection, he decided to do his own. Even with his background as a book producer and magazine editor, it took two years and a whole crew of able people to prepare this book. One old–time hardware manufacturer admitted that he'd "been in the business for over forty years and still hadn't figured it out." Every real hardware store should have a copy of this book somewhere near the service desk; clerks should be made to study it during lulls in the store's activity, and it should always be ready for the customers who are shopping for "whatchamacallits" or "thingamajigs."

The book is laid out the same way a hardware store or home center is. While there is a section about hand tools, specialized tools for particular products or projects (such as masonry tools) are

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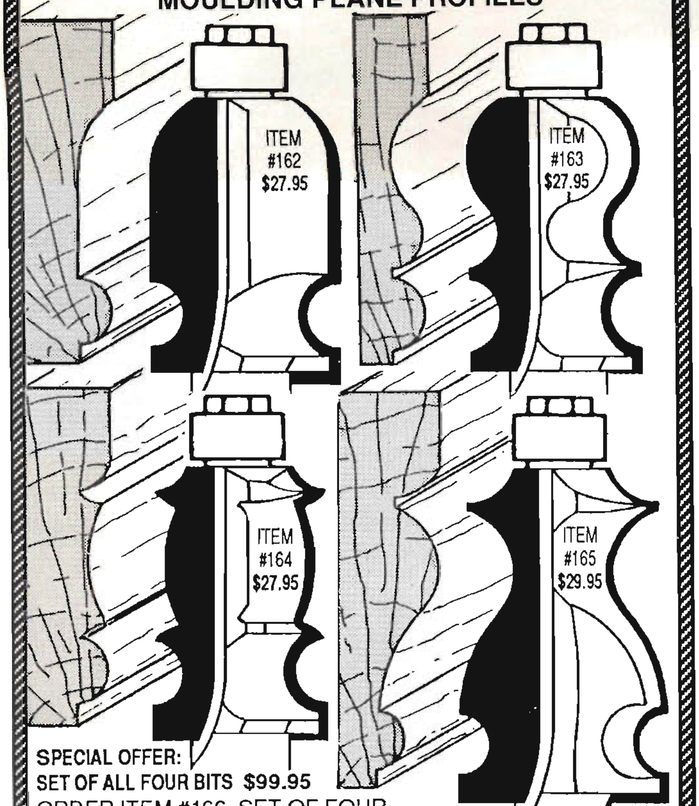

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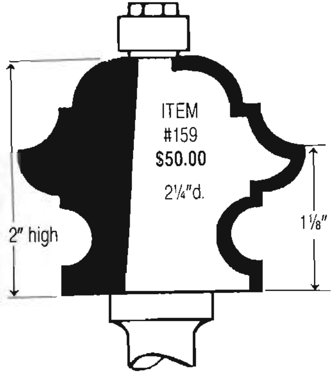

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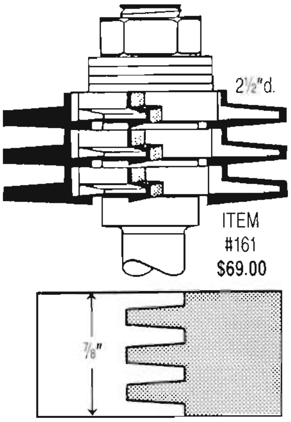
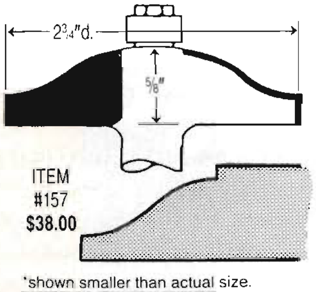
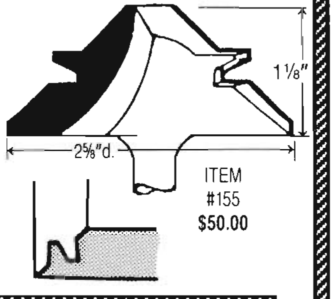


### RAISED PANEL*



### LOCK MITRE*



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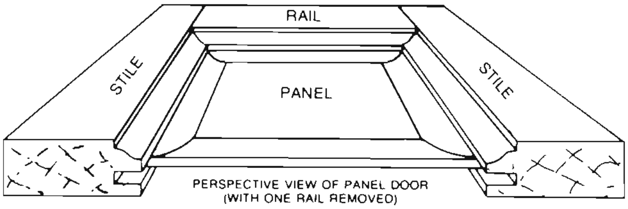

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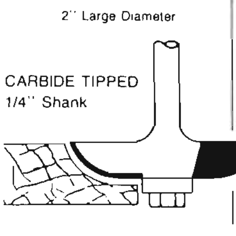

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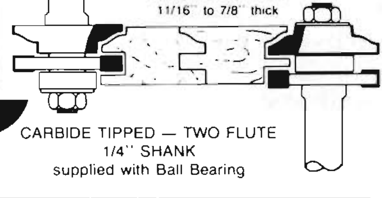

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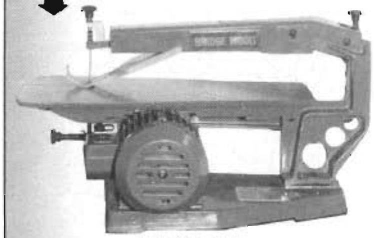

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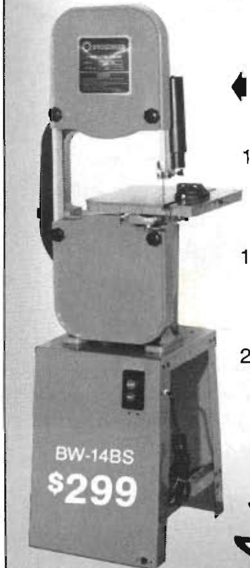

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# Book Reviews

continued from page 9

found in their own section. The more common items in each section are placed nearer the front of the section. The book leaves out heavy construction materials, esoteric cabinetmaking tools, housewares, electronics, gardening items, and hobby materials, among other things; there's also precious little "how–to" advice. The tips here echo the advice you might get from a "good" hardware clerk. The book also points out the amount of thinking that must precede every hardware purchase, for "there's no such thing as 'just a paintbrush.'"

The book opens with the commonest hand tool of all, the hammer—in a multitude of varieties—and closes with fire extinguishers. Between the two are nearly everything you'll need from the hardware store and, no doubt, a few things you didn't even know they had. If you think you already know the names and everything else about most of the goodies in the hardware store, you may be amazed at just how much you learn from this book. PW

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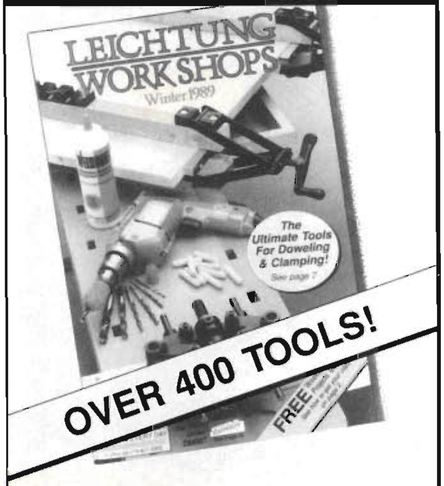

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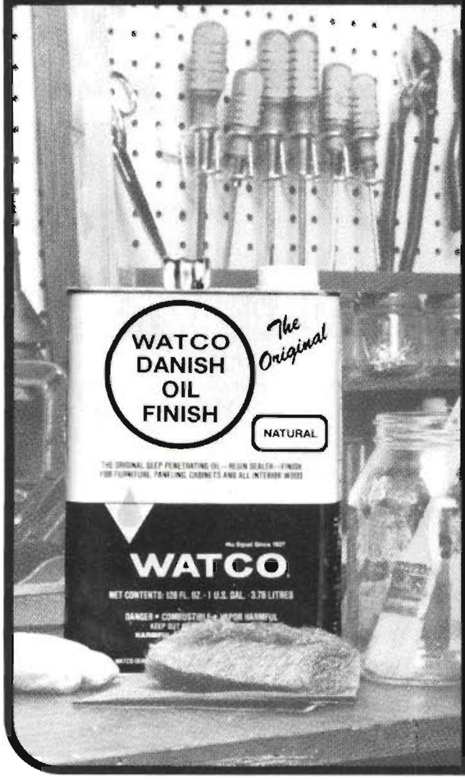

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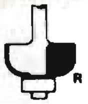
|  R | | COVE | | | | |
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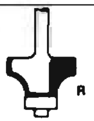
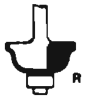
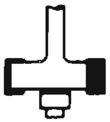
| | #03 | 1/2" R | 1/2" | 1-1/2" | 5/8" | 15.00 |
|  R | | ROUND OVER | | | | |
| | #04 | 1/4" R | 1/4" | 1" | 1/2" | $15.00 |
| | #05 | 3/8" R | 3/8" | 1-1/4" | 5/8" | 16.00 |
| | #06 | 1/2" R | 1/2" | 1-1/2" | 3/4" | 19.00 |
|  R | | ROMAN OGEE | | | | |
| | #07 | 5/32" R | 5/32" | 1-1/4" | 15/32" | $18.00 |
| | #08 | 1/4" R | 1/4" | 1-1/2" | 3/4" | 20.00 |
|  | #11 | 3/8"<br>RABBETING | Deep 3/8" | 1-1/4" | 1/2" | $14.00 |
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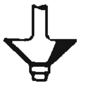
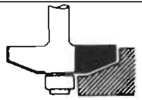
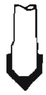
|  | #12 | 45° Chamfer | 45° Angle | 1-1/2" | 5/8" | $15.00 |
|  | #15 | Raised Panel | 20° Angle | 1-5/8" | 1/2" | $25.00 |
|  | #35 | 1/4" V Groove 90° | | 1/4" | 1/4" | $ 8.00 |
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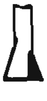
|  | #16 | 3/8" Dovetail 9° | | 3/8" | 3/8" | $ 7.50 |
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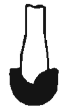
|  | | CORE BOX (ROUND NOSE) | | | | |
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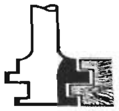
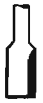
|  | #056 | Tongue & Groove<br>(FOR WOOD THICKNESS FROM 1/2" to 1")<br> | | 1-5/8" | 1" | $30.00 |
|  | #24 | 1/4" Straight Bit | | 1/4" | 3/4" | $ 7.00 |
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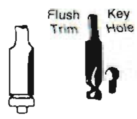
|  Flush Trim / Key Hole | #13 | 1/2" FLUSH TRIM | | 1/2" | 1" | $ 8.50 |
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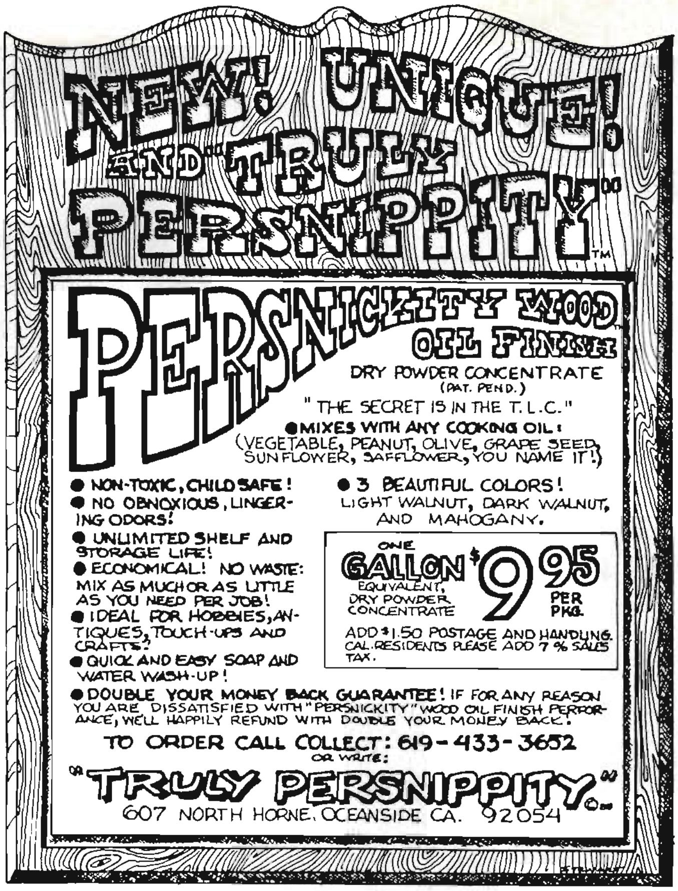

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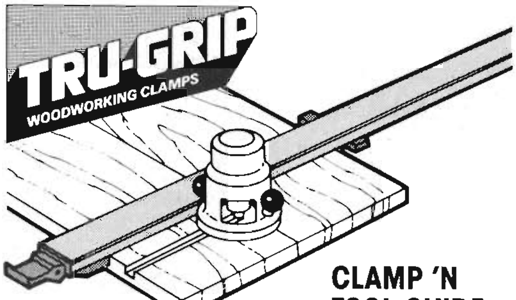

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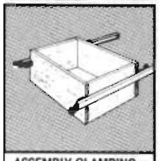
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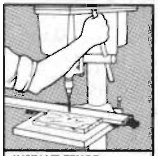
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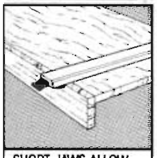
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# Videoscene

by Alan Marks

**The Stanley Armoire** with Bruce Marchard and Terri-Lee Hysell, ©1988 by The Stanley Works, Advertising Services, Box 1800 Armoire, New Britain, CT 06053, 35 minutes, $14.95

The claim of this tape is that it, along with the Stanley brochure that goes with it and a parcel of Stanley hand tools and hardware, will enable you to nail and glue together an armoire. Three types to choose from—and you don't even need a single major power tool! Not even a table saw, honest. Your friendly neighborhood lumber yard will rip your hard-to-handle plywood sheets into manageable panels for a nominal fee, and your Stanley hand tools will do the rest. Imagine the challenge of cross cutting large plywood panels with a hand saw! Takes a good eye and a steady hand, but you can do it! Provided you don't care too much about tight-fitting joints and such.

As I hope you can tell, I have a few reservations. Furthermore, it is my opinion that anyone who assumes that a framing square (even a Stanley) will draw an accurate 90° line deserves whatever pickle he gets himself into as a result.

Clearly the emphasis of this tape is not on producing a quality piece of furniture, but on selling Stanley tools and hardware. This is all done very slickly. This is the first video on woodworking I have seen that had a script and a commercial actress. Not that I'm complaining. Terri-Lee Hysell is a nice-looking lady. (Could hers possibly be a stage name with a concealed innuendo? High-sell? Hmmm...) She adds an element of feminine charm to the do-it-yourself world, something it has lacked until now.

One fortuitous thing for this video was the choice of an armoire as a sales vehicle because it is a piece with so many applications, for clothing, storage of household items, or as an entertainment center, to name a few. I am surprised nobody thought to present an armoire project before this and I hope someone does it again, next time with more integrity and minus the sales hype.

**Refinishing Furniture** with Bob Flexner, ©1988 by The Taunton Press, Box 355, Newtown, CT 06470, 60 minutes, $29.95 (Rental: $14.95)

This excellent video comes with a companion booklet that adds significantly to the viewer's knowledge of the subject, instead of merely paraphrasing the lessons on the tape.

In tried and true pedagogical fashion, Bob Flexner stimulates the viewer's curiosity for knowledge by raising questions which are then answered as instruction proceeds. He tells us at the start that he has run across many curious notions about what refinishing furniture entails. The subject has been grossly oversimplified, he says. One prevalent misconception is the idea that an entire piece has to be refinished because of a few surface blemishes. Another myth has it that important differences distinguish one commercial furniture polish from another.

He then piques the viewer's interest by showing many of the various ways in which furniture can be finished, including some less desirable treatments. He shows how to revive various finishes instead of stripping them, demonstrating the use of soap and water, and TSP (Trisodium Phosphate) and wax. I particularly appreciated his method of wrapping a glob of wax in a cloth for easy application.

In the section on stripping, Flexner strongly recommends using mineral spirits or lacquer thinner instead of water to rinse off the methyl ethyl ketone (MEK) stripper in order to protect the wood from damage. Of course, this can get expensive and it creates noxious vapors.

In his demonstration using MEK, Flexner did not clearly

---

*Alan Marks is a cabinetmaker in Carmel Valley, California, and a contributing editor to* PW.

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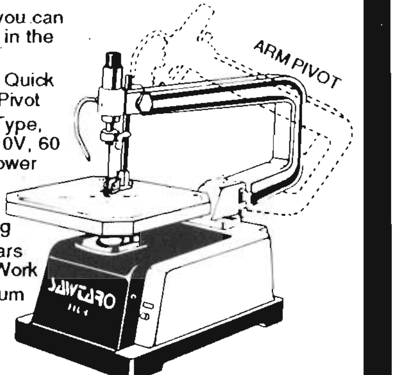

explain why stripper should not be worked over once applied. He mentions stirring up wax, but the viewer gets the impression that it is the wax dissolved from the old finish that somehow produces a negative effect. If I am not mistaken, stripping compounds contain wax which floats to the surface and acts as a barrier for preventing the evaporation of solvent. It is this barrier of wax, I believe, which should not be broken or disturbed to enable the solvent to remain active. Otherwise, there was lots of good advice and information in this section!

In the next section of the video, we learn how to prepare a blemished surface for finishing, including how to remove surface defects, black rings and water stains. He demonstrates methods for bleaching and of course, the old standby, sanding. A useful tip from Bob Flexner: fold your strip of sandpaper in thirds accordian–like so its segments will not slip against one another. That one was worth the entire purchase price to me.

In the following section, when Flexner talks about staining, he presents the most detailed exposition I have run across in a video. He speaks of pigments and dye and oil stains, and demonstrates bleaching with potassium dichromate and with a two-part bleach for altering the color of new replacement parts in order to match the original wood.

The next unit, on sealing and filling, is also a honey; but my favorite contains information on glazing, wherein is revealed the secret of How to Produce the Fabled Patina of Age using Japan Drier. For me, Japan Drier is the missing link. I wish I had been informed of its magical properties when I used to color/blend patches of new wood into old on repair jobs, rather than mixing and applying layers of concentrated watercolor pigments and clear acrylic lacquer from spray cans. The problem with this was that I could never de–gloss the lacquer properly to match existing gradients of sheen. And then there was the lengthy drying time of the pigments to contend with. As a result of seeing this video, I plan to collect various colors of Japan Drier to have on hand, and I'll stop using lacquer. I am convinced that tung-oil varnish will make it possible to match older finishes.

From time to time during this tape I found myself getting annoyed at the way Flexner rushed from topic to topic without even taking a breath, so to speak. I kept hoping the producer would interject an occasional musical interlude to slow him down, but such relief was all too rare. It was as if someone had allotted only a sixty–minute time limit for ninety minutes' worth of material.

There are good sections on oil, varnish, shellac, and lacquer, and an excellent one on adjusting and repairing finishes, with which the video concludes. I am familiar with French polishing, but French padding was a new process to me. This finish, which contains both nitrocellulose lacquer and shellac, is apparently both easier to put down and more water–resistant than French polish, which contains only shellac. PW

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# The Business End

**by Peter Good**

## Service Contracts for Woodworking?

Service contracts are certainly nothing new in our society. In some commercial sectors, service contracts have been the backbone of the maintenance effort for many years. During recent times, service contracts, and their first cousin, extended warranties, have become common options when buying cars, mechanical equipment, electronic devices and numerous other items. One area in which I haven't seen them is woodworking, yet they are probably needed here as much or more than in many other fields.

The nature of wood is such that we can't predict exactly what it's going to do in the long run. Even when we make a piece of furniture out of high quality, well dried, carefully selected wood that looks beautiful, there is no guarantee that six months from now it won't shrink, crack, buckle, fade or do some other inconsiderate thing which proves very distressing to both the person who made it and the person who bought it. There is also a seemingly endless parade of other things that can go wrong involving finishes, glues, joinery, hardware, mouldings, edge–banding and who–knows–what–else that may decide to act up somewhere down the line. When this happens, we get a call from the unhappy customer, and we are more or less expected to correct the irregularity, generally without charge. In this situation, somebody will come out on the short end. If a charge is made for the repair, adjustment or whatever, the customer loses. If no charge is made, you lose. I suggest that incidents such as this could be turned into a win-win situation through the use of a service contract or extended warranty.

Basically, both service contracts (sometimes called maintenance agreements) and extended warranties begin when the original warranty expires. These plans are sold as options and generally can be bought either at the time of original purchase or at any time up to the expiration of the warranty. These options vary in what they cover, but generally a service contract provides routine scheduled maintenance such as cleaning, lubrication and adjustments. Also, all repairs which may be required are performed without additional charge for either materials or labor, regardless of the cause—with the exceptions of abuse, misuse or, in some cases, accidental damage. Extended warranties commonly do not provide any routine scheduled maintenance, but protect the purchaser against repair costs in the event of failure of certain specified parts, components or assemblies. Extended warranties usually cover a specific period of time and are not renewable. Service contracts, although they may cover a specific period of time, are commonly sold by the year, and are renewable, perhaps indefinitely. There are many variations of service contracts and extended warranties, but the intent is always the same: to provide the buyer with insurance against things going wrong, and to provide the seller with compensation to cover after-sale service.

Although I've never seen such contracts offered by woodworkers, I see no reason why they wouldn't work. From the standpoint of the woodworker, the benefits would be: 1) additional income from the sale of follow–up service insurance, 2) continued contact with the customer, enhancing the prospects of future sales, 3) ability to monitor the performance of the goods, 4) early detection of problems in the goods, resulting in lower repair costs, and 5) promotion of good will through continued attention to the customer's needs.

From the buyer's point of view, the main benefits are: 1) peace of mind and the assurance of continued service being performed on the goods without fear of additional charges, 2) the reduced likelihood of problems occurring in the product, and 3) the maintenance of the original appearance and level of performance of the product.

So, how would this actually work? First of all, you'll need to make, as accurately as possible, an assessment of the probable and possible things that could be required for the continued service and repair of whatever goods you are producing. Then decide which you're willing to assume cost-free responsibility for and what you would need to charge as an annual service contract fee in order to cover your costs for the *probable* service items, plus an appropriate allowance to cover a portion (say one third) of the *possible* service or repair items. You need to understand that with any insurance policy (which this is, in effect), each side is gambling. The customer is gambling that repairs or maintenance will be needed and wants to avoid having to pay extra for them. You are gambling that the repairs won't be needed, which means that you will make an additional profit through the sale of the contract or extended warranty.

Let's look at an example of how this might work. Suppose you produce a dining table for someone. It would be reasonable for you to guarantee the table to be free of defects in material or workmanship for a period of 90 days, which is sufficient time for most problems to show up. Providing a longer guarantee would be inadvisable because you would be assuming continued responsibility for wood—an imperfect, natural material which, despite your knowledge, expectations and woodworking abilities, might do something weird and unpredictable that would make both you and your customer unhappy. The basic idea of standing behind your work has some merit, but let's not get ridiculous about it. Instead, you could offer, at any time up to the expiration of the 90–day guarantee, either a service contract or an extended warranty.

How do they differ? First of all, figure out what could go wrong with this table, or what might be needed to keep it in first–rate condition. Then, decide what would be appropriate to offer in the way of a protection plan. An extended warranty would typically protect against the malfunction or failure of specific named things for a certain non–extendable period of time. An extended warranty is non–extendable because the maintenance provided is corrective only, and allows the overall condition of the article to deteriorate over time, as all things do. If the warranty is renewed, you would become responsible for an increasing number of repairs

**continued on page 18**

*As the owner of Grand Openings in Oakland, California,* ***Peter Good*** *manufactures doors. He also gives seminars at national woodworking shows on the business aspects of running a small shop.*

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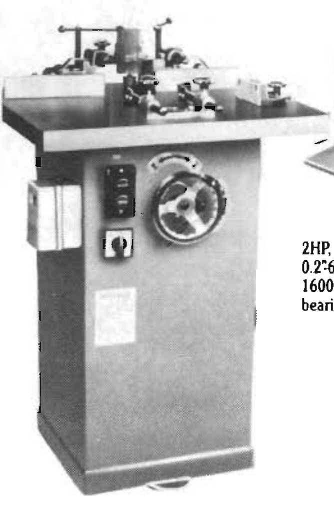

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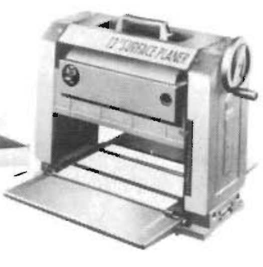

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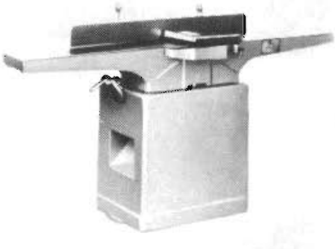

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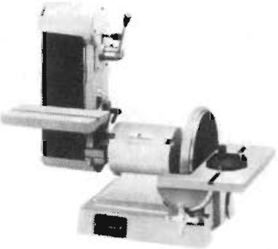

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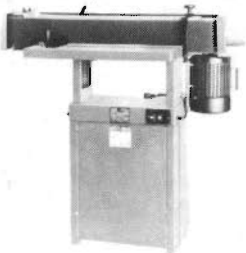

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| 10" × 40T | 156 | 94 | 7 1/4" × 30T 3/32" | 112 | 49 |
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# The Business End

continued from page 16

because of the continuing deterioration process.

In contrast, a service contract provides preventive maintenance, a program which cares for and continuously restores the article to an approximation of the condition when new. An extended warranty might cover such things as failure of joinery, separation of veneers and loosening or malfunctioning of hardware for a period of five years. Such a plan would not cover any other things which might go wrong such as failure of the finish, checking, splitting, cracking, warping or color changes in the wood, or anything resulting from damage or misuse. An extended warranty such as this would automatically terminate at the end of the five–year period or upon sale or transfer of the table. If you felt pretty confident that no more than, say, two service calls would have to be made during the five–year period to correct named discrepancies—and that those problems could each be rectified within two hours including travel time, without taking the table back to your shop—then a reasonable cost for the five–year extended warranty on the table might be 30% of the original price. If repairs other than those named in the extended warranty are needed, they should be charged for at your current rates.

Service contracts are usually sold for a period of one year and can be renewed year after year, at whatever your current price for such things is at the time of renewal. A service contract covers more than an extended warranty, and under it there would normally be a provision that you will correct everything that needs correcting and also provide cleaning, finish restoration and preventive maintenance at specific stated intervals, usually once a year. Also all labor and materials would be included in the price of the contract. The ever-present exception, of course, is any work to correct problems from damage or misuse, which is charged for separately. A reasonable price for a service contract of this type would be 15% of the price of the table per year. Each year, however, the contract price is based on the current price of the table if you were to make it again, not the original price. Service contracts, in order to be renewable, must be continuously in effect from the expiration of the original 90–day guarantee and could not be purchased once a lapse in coverage occurs. Otherwise, because of neglect and non-maintenance, you could be in for much more work than you bargained for. Also, unexpired service contracts generally remain in effect when the product is sold or transferred.

The concept of service contracts and extended warranties would go a long way toward improving performance, appearance and useful life of products made by woodworkers, and would also provide fair compensation for follow–up service which otherwise might be awkward to charge for. In that respect, it would bring woodworkers one step further toward making a decent living through sensible business practices. PW

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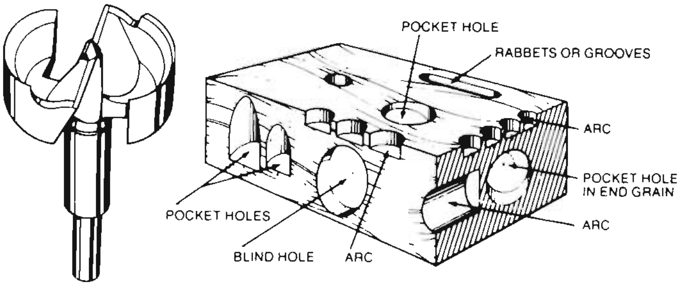

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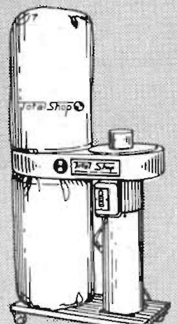

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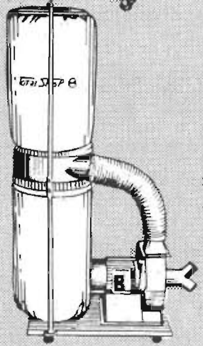

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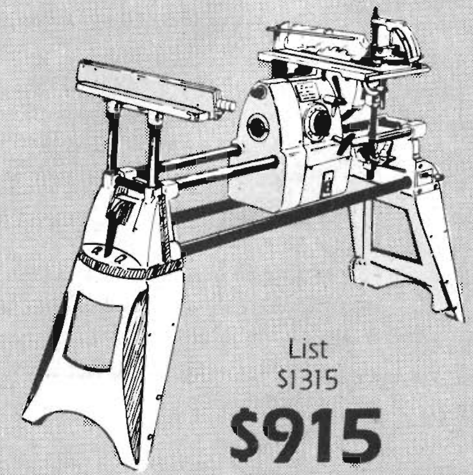

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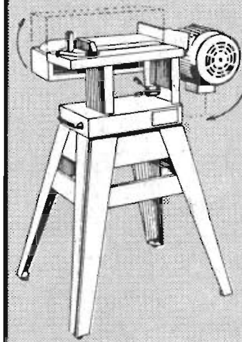

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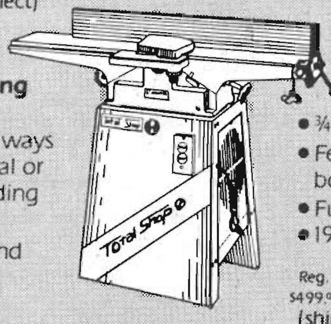

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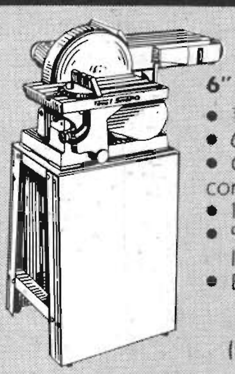

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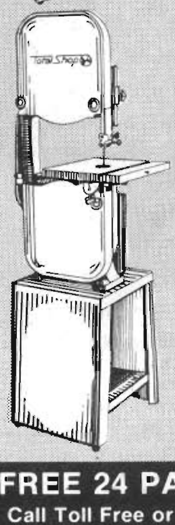

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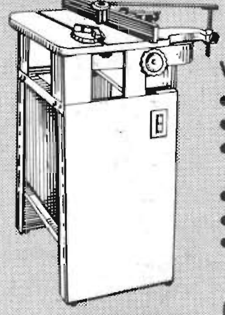

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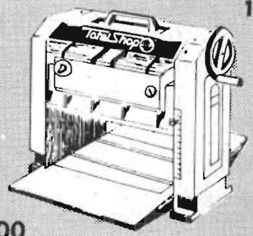

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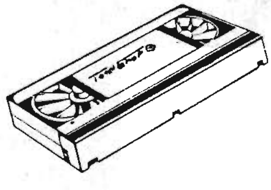

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# Tried and True

by Graham Blackburn

## The Dado Plane

What I find at yard sales and the like never ceases to amaze me, especially when it comes to old tools. I'm referring to genuinely old tools—a hundred years old or more—many of which may have seen a great deal of use even if they have subsequently lain ignored and forgotten for the last fifty years or so. In this age of antique collectomania almost anything over fifty years old is collected avidly by some group or another and, consequently, almost anything dirty enough to look the least bit old is enthusiastically offered for sale at yard sales, garage sales, flea markets, and even in antique stores (where they ought to know better). As a result, between eagle-eyed collectors on the one hand and people eager to put up for sale almost anything that looks the least bit less than brand new on the other, it is a never–ending surprise to me that something really old (and of real value) does show up.

Of course, one reason for this is that despite the plethora of specialist books and price guides on everything from bottle caps to bass drums, some things slip through the net simply because they are not recognized for what they really are. The dado plane is a case in point. It looks a lot like a moulding plane—which fact alone often leads many overenthusiastic antique dealers to charge an arm and a leg for it. Usually, however, even in California where no moulding planes were ever commercially made, they may commonly be found for just a few dollars or so. In fact, the average price at flea markets and the less pretentious antique stores seems to be between ten to fifteen dollars.

Like many other things, once you start looking, there are more of them than you might otherwise think. There were, after all, hundreds of thousands of these planes made over the better part of two hundred years. Although commercial production to all intents and purposes ceased in the nineteen twenties (there are still a few models made and offered for sale today in specialist woodworking tool catalogs such as *Woodcraft Supply Co.)*, their production in the last century was truly staggering. Early examples from the middle or beginning of the eighteenth century are far less common and command commensurately higher prices when they enter the knowledgeable tool collectors' market.

Nevertheless, despite these older planes' greater rarity, since there is little difference (to the untrained eye) between one moulding plane and the next, it is by no means impossible to discover a plane that is well over two hundred years old. Even so, when I discovered an example of one of the very first *dado* planes ever made, I was truly amazed. But before going further with my latest discovery, let's examine dado planes as a group more closely.

### What Is a Dado Plane?

First of all, a dado plane (see Figure 1) is not a moulding plane. It may look like one, but it does not and cannot make mouldings; and in any event, a dado is not a moulding. Like many other planes that get lumped together as moulding planes simply because they are all about 9-1/2" long, somewhat thin, and made of wood, the dado plane is a special-purpose plane whose function is not to **stick** mouldings (the correct term for the process of forming a moulding on solid wood with a moulding plane), but to **form** joints.

There are many varieties of this type of plane: plough planes, tongue-and-groove planes, rebate planes and gutter planes, to mention just a few. For the most part the names are self-descriptive, and a little thought will demonstrate that these do not have very much to do with mouldings. The dado plane is a little different. The very word dado has several different meanings, not all of which are properly understood anymore. Furthermore the plane has been known by other rather enigmatic names such as banding plane, cut–and–thrust plane, raglet, trenching plane, housing plane, and carcase grooving plane.

Without going into the etymology of the word, dado currently has two distinct meanings. To the general public it means an ornamental band of paper, plastic, or wood—running around the top of an interior wall. To the woodworker, however, it means a specific kind of groove (see Figure 2), and it is with this latter meaning that we are concerned here. To be precise, the woodworker understands a dado to be a groove that runs across—rather than with—the grain, and is usually wider than it is deep. (Being deeper than it is wide is the primary characteristic of a groove, no matter which way it runs.) These terms, then, define the dado plane's true function: it is used to make a groove (or dado) across the grain.

In the days before drywall, rooms were often paneled with wood. This paneling was frequently let into a groove cut in the flooring by means of a tongue formed along the bottom edge of the paneling's frame. The receiving groove in the flooring was made with the dado plane. This is the reputed original use of this plane, and supposedly explains how the name came about. When you bear in mind that wainscotting was commonly capped by a so-called "dado" rail, it becomes clear how eventually the use of this word "dado" was transferred from the rail, to the paneling, to the plane used to cut the groove for housing it and, at last, to the very groove itself. At least, that's one story. But, true or not, the fact remains that today both the groove and the special-purpose plane used to make it are called dadoes.

I'm not totally convinced myself, and years of looking through old tool catalogs has tended to demonstrate that there never was much consensus regarding either nomenclature or use. Nevertheless, it is true that this plane is wonderfully well suited for forming what we now call dadoes—wherever they might be needed.

### How the Dado Plane Works

Two things define and qualify the dado plane for its ability to make dadoes. First is the skewed iron that extends all the way across the sole, and second is the presence of a two–spurred iron placed in front of the main cutting iron (see Figure 3).

The skewed iron ensures a smooth, shearing cut when used across the grain, and is a feature shared in common with various rebate planes and fillisters, as well as many of the metal planes made by Stanley over the years. This feature alone,

*Graham Blackburn is a furniture designer/ maker in Soquel, California and the author of many books on woodworking and home maintenance including* Floors, Walls and Ceilings.

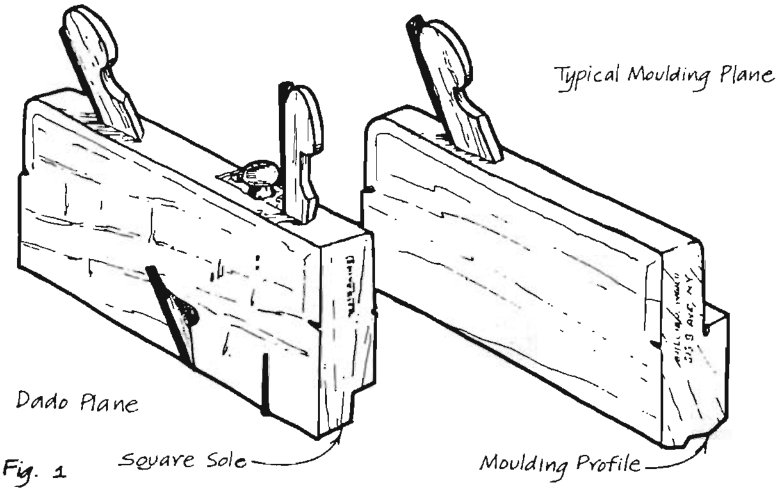


Fig. 1

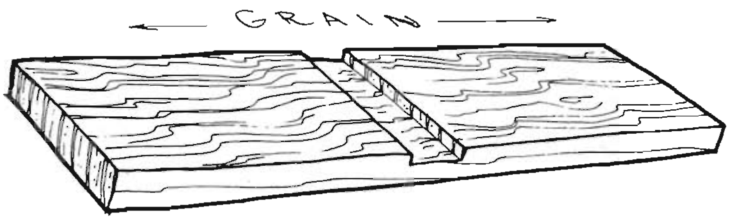


Fig. 2 Dado in Board

however, would not be sufficient to create a clean dado were it not for the presence of the two little spurs that precede the main iron and score the fibers ahead of the shaving to be taken. By being exactly as far apart as the blade's width, the spurs ensure that the dado may be formed with perfectly clean sides. Without these spurs the bottom of the dado might be smooth enough, but it would undoubtedly suffer from much tearout at the edges.

Both irons—the cutting iron and the double spurred (or "knicker") iron—are held in the stock by wedges, and these two wedges are what constitute the dado plane's most obvious distinguishing characteristic. Quite a few moulding planes and other special-purpose planes can be found with double wedges, but these wedges and irons are invariably located side by side. The dado plane's wedges are in line, like the masts of a sailing ship.

The second distinguishing characteristic of the dado plane is that it is the only other plane besides the rebate plane that has a tapered mouth, which discharges the shavings off the bench—that is, out of the left–hand side of the plane (assuming that the plane is being

illustrations by the author

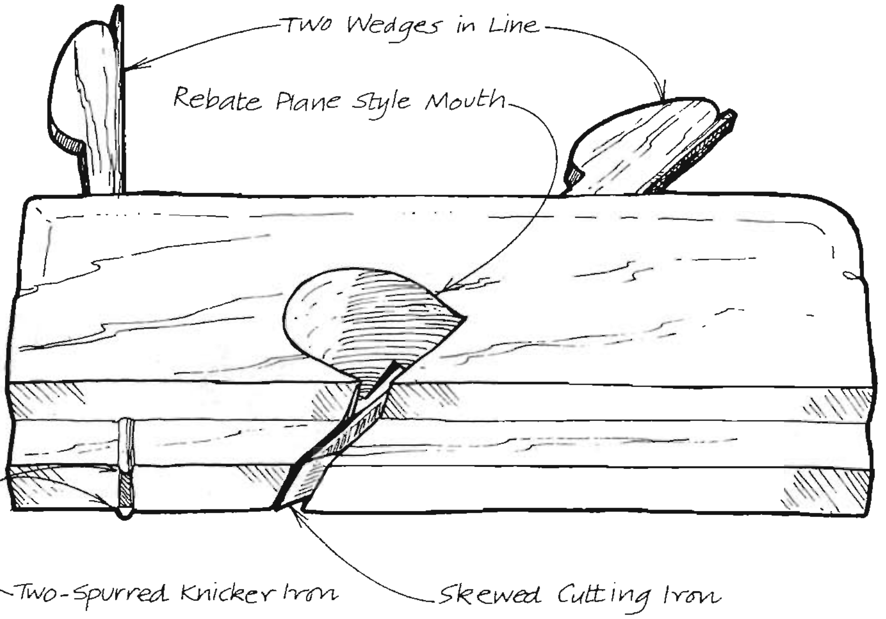


Fig. 3 Distinguishing Features of Dado Plane

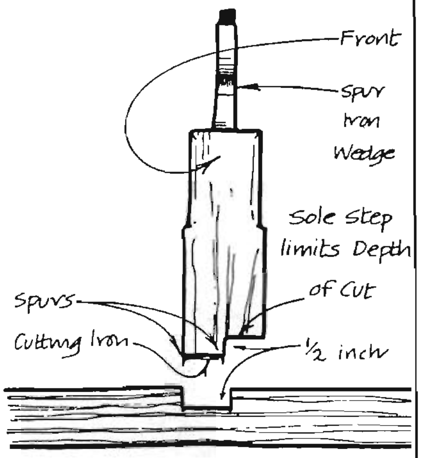


Fig. 4 Maximum Depth of Dado

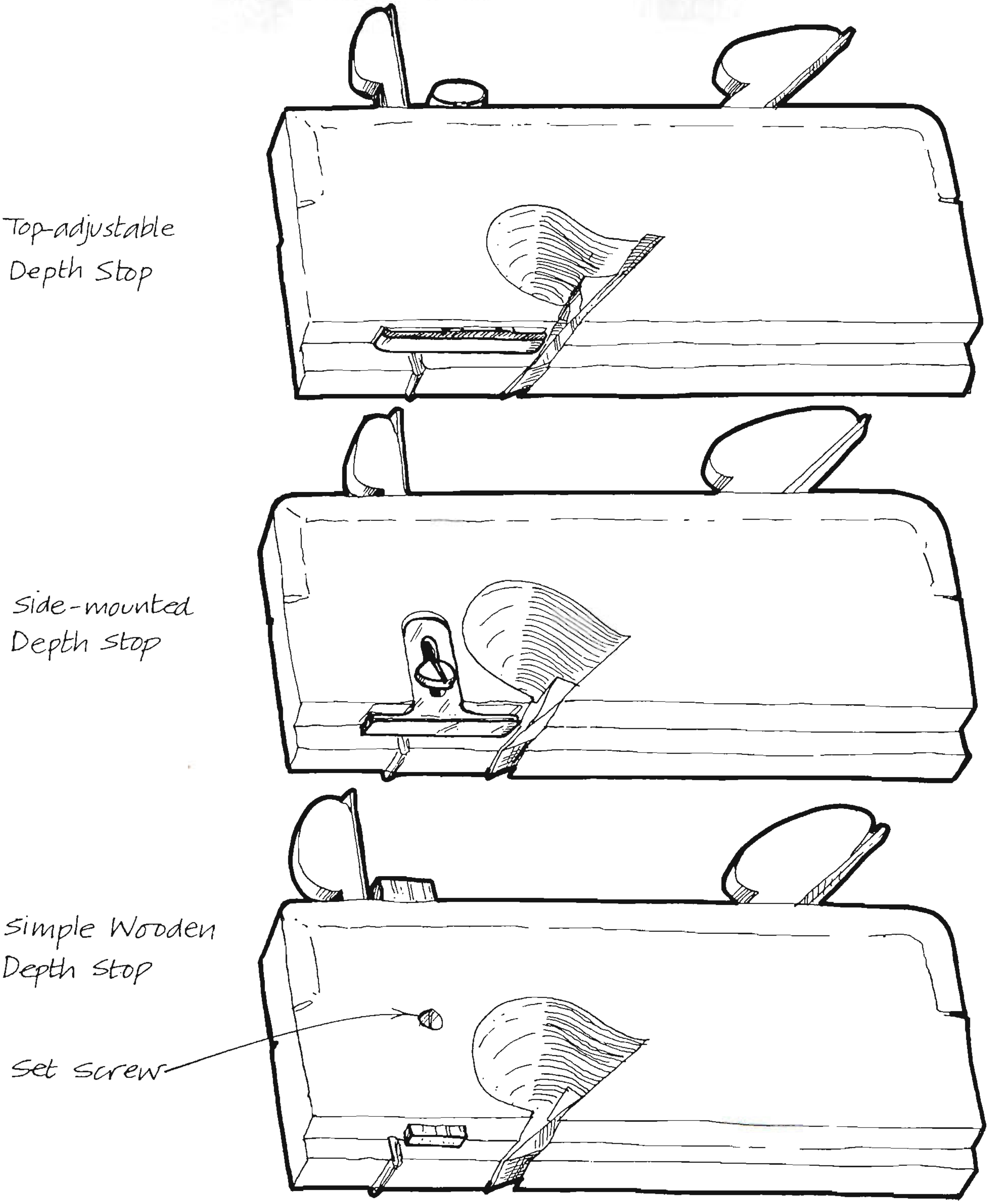
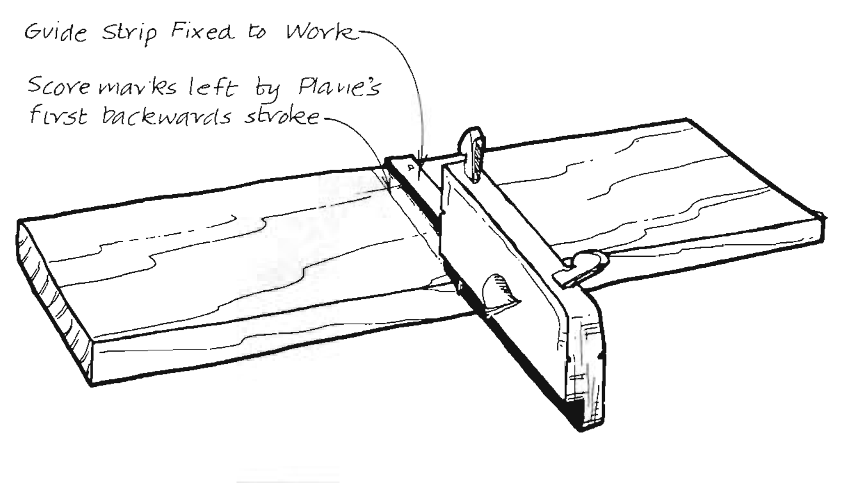


Fig. 5 Depth Stop Types

used by a worker standing at the bench and facing to the left). The reason for this is due to the fact that the iron is skewed with the trailing edge on the left–hand side of the plane, and that the dado plane is descended directly from the rebate plane itself. Furthermore, in use there is invariably a fence on the right–hand side of the plane which would impede the shavings' exit if they were to be discharged on this side.

Fig. 6


Guide Strip Fixed to Work
Score marks left by Plane's first backwards stroke

Illustrations by the author

All dado planes share these two features. The vast majority are 9-1/2" long—the standard length for all moulding planes and related planes since early in the nineteenth century. However, manufacturers commonly made dado planes in various widths—typically in sets increasing by 1/8" from 1/4" to 1". The other chief differences encountered among dado planes is the presence or absence of variously designed depth stops.

It is true that all dado planes possess a built-in depth stop by virtue of the fact that the width of the dado is less than the thickness of the plane's body, and the resulting step down in width at the sole results in a maximum depth that can be worked which is around 1/2" (see Figure 4). But since it is not always convenient to form a dado of this depth, some form of depth regulation becomes in order to work a groove of consistent depth.

Consequently, the majority of all dado planes may be found with one of three main kinds of depth stop (see Figure 5)—although there were some cheap models made with no stop at all. When it became necessary to form a dado to any depth other than that formed by the plane's own stepped sole on these depth stopless models, the usual solution was to tack an extra thickness of wood to the bottom of the plane. Planes with no built-in depth stop often bear traces of this having been done in the form of old holes, blackened soles, and the remnants of nails.

The earliest form of depth stop (which continued in use as the cheapest form) was the provision of a simple wooden stop, usually made of boxwood, which was morticed very snugly into the stock, so that friction alone sufficed to hold it in place. Adjustment up or down was accomplished by tapping it in or out with a mallet or hammer. Regardless of how well fitted this form of depth stop was initially, sooner or later, with use or shrinkage caused by dryness, it became loose. The obvious cure was to secure it in the required position by means of a screw inserted through the cheek of the plane. Consequently, it was not long before manufacturers were providing planes with depth stops that were fully securable by wooden or brass set screws through the sides of the plane.

The final solution, used in the best planes, was to adopt the kind of top-adjustable depth stop found in fillisters and many plough planes. This consisted of a steel shoe which emerged from and retracted into the sole of the plane, thereby stopping the action of the plane as soon as it made contact with the work. A curious feature of these top-mounted depth adjustment screws is that they operate with a reverse thread. To cause the depth stop to emerge from the sole of the plane it is necessary to turn the screw counter clockwise, something which almost everyone, at first, tries to do the reverse of!

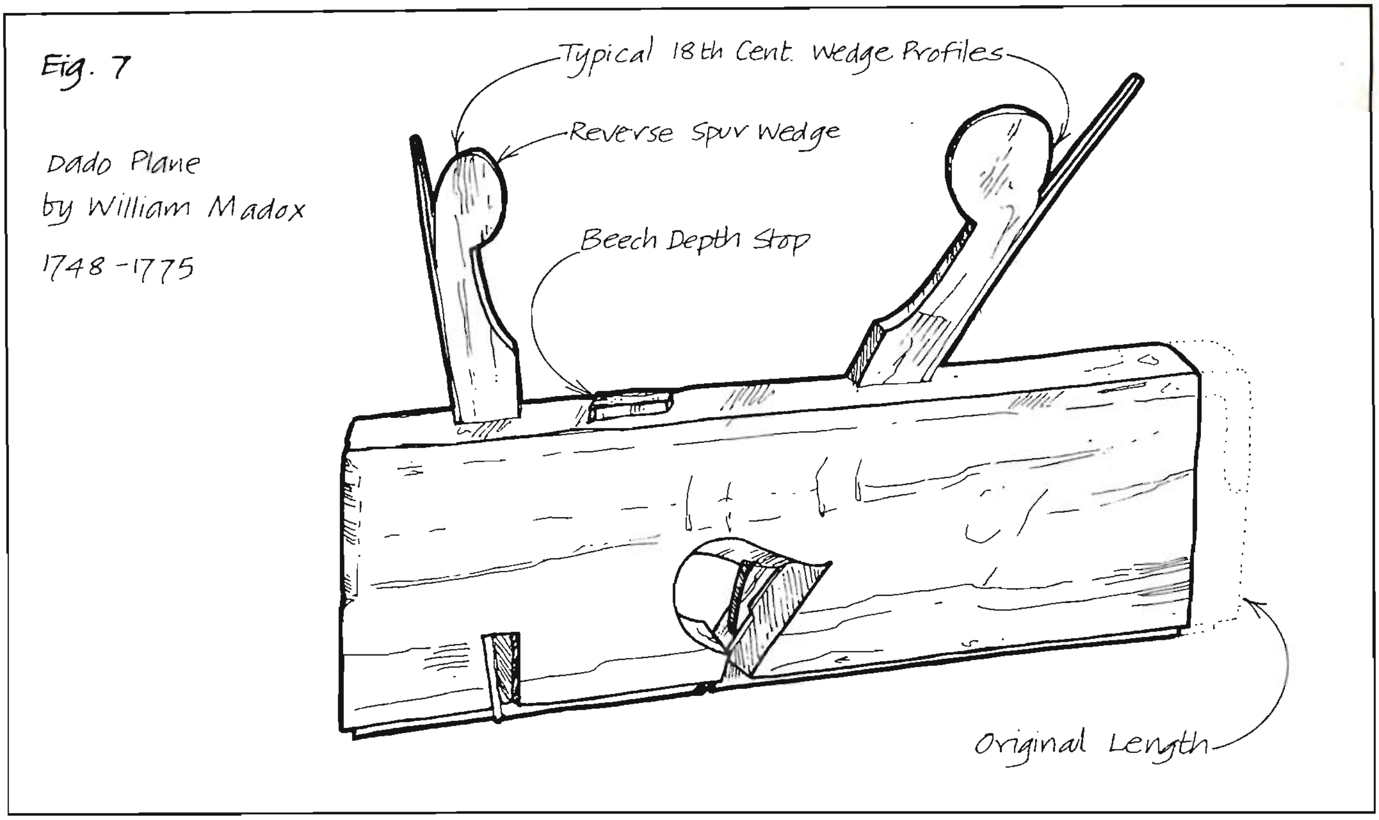
## The Dado Plane in Use

On all planes, of course, the irons must be sharp or very little will be possible. But on the dado plane it is equally important that the spur iron and the cutting iron be in perfect alignment. To make sure of this, the spurs must only be sharpened on their *inside* edges. To do otherwise would alter their effective width and destroy their relationship to the width of the skewed iron. Since setting of the irons is achieved by tapping on the front of the stock to lower the blades and tapping on the back of the stock to raise the blades, it is usually best to start with the spur iron set much higher than is needed, adjust the cutting iron, and then gently lower the spur iron by tapping directly on the end of its tang. Be careful, for this end of the iron is very soft and can easily bend.

There is a lot more that could be said on the fine adjustment of wooden planes' irons; but with regard to dado planes the chief point is that both irons be in perfect alignment, not only with each other but with the sole through which they protrude as well. If this is observed, the only other vital precaution is to start work by drawing the plane backwards across the board that is to be dadoed so that the first marks made upon the wood are the parallel lines scored by the spur cutter.

Since the dado plane is intended to be used across the grain and to sink into the wood as it works, it cannot have a fence attached to it. Consequently, a guide taking the place of a fence must be provided by attaching a straight edge to the work, immediately to the right of the intended dado. In carpentry, this guide is usually a lath or other thin, straight strip nailed onto the work with small tacks or brads (see Figure 6); in finer work, a guide may be clamped on.

After the guide is in place and the depth stop set to the required depth, the



Illustrations by the author

plane is drawn backwards across the work and then pushed forward. If the two irons are truly in alignment and the plane is held tightly against the guide, distinctively curled shavings will issue out of the plane's mouth, cutting a smooth–bottomed, straight–sided dado with very little effort. It is one of the simplest tools to use, eminently more pleasurable than a router, being quieter, safer, and producing an immaculately smooth, burn-free, "chipout-less" cut.

Obviously, the dado plane cannot compete with a router or a dado blade in a table saw when vast quantities of grooving are required, but in custom furnituremaking, or for small projects, the convenience of being able to reach for the right size dado plane and, with a few quick passes, quietly cut a perfect dado is unmatched.

### My Amazing Discovery

Since I enjoy using these planes so much, I am always on the lookout for them, and indeed, as I explained at the beginning, they are not too hard to find. It has, in fact, gone past the point with me where I am still looking for a complete set; I now enjoy finding examples with better depth stops or other curious features. But I never expected to find a plane made by the very man credited with having developed the dado plane over two hundred years ago—and more than five thousand miles away from where it first saw the light of day.

The gentleman in question was one William Madox, who is known to have operated a plane–making business in Peter Street, Westminster, near London, from 1748 to 1775. The first "proto-dado planes" made by Madox were little more than regular skewed rebate planes with a projecting sole formed by cheeks on either side of the iron, and were fitted with two depth stops and two separate spurs or knicker blades. His planes were typically longer than later nineteenth century planemakers' planes, being on average about 9-7/8" long, and a further idiosyncrasy was that his irons were set at 47° rather than the 50° common for later planes.

The dado plane that caught my eye at the yard sale I visited was keeping company with numerous other wooden moulding planes and various metal bench planes. Although it was a more developed version than Madox's original design, it still exhibited (see Figure 7) significant differences from the later standardized types of the nineteenth century. Most noticeably, the wedge holding the spur iron was positioned facing backwards instead of forwards. Despite this glaring difference, there were other clues to this plane's age. Although covered with a venerable patina, it was apparent by the roughness of the surface at the back of the plane, and the truncated form of the chamfers that are typically carried along the top of the stock and down the back, that this plane had been sawn to a shorter length than originally made. This is a frequent occurrence with eighteenth century planes, due, no doubt, to later owners wanting to be able to fit these planes into the same size space as would contain the shorter, standardized lengths of nineteenth century tools.

Together with the 47° angle at which the main iron was bedded and the distinctive round shape of the wedge heads, I had no doubt that I had found an old plane; but when I saw Madox's name stamp with its distinctive eighteenth century zigzag border impressed in the plane's toe, I was truly amazed. There is no knowing what may turn up—anywhere. PW

# Tests & Comments

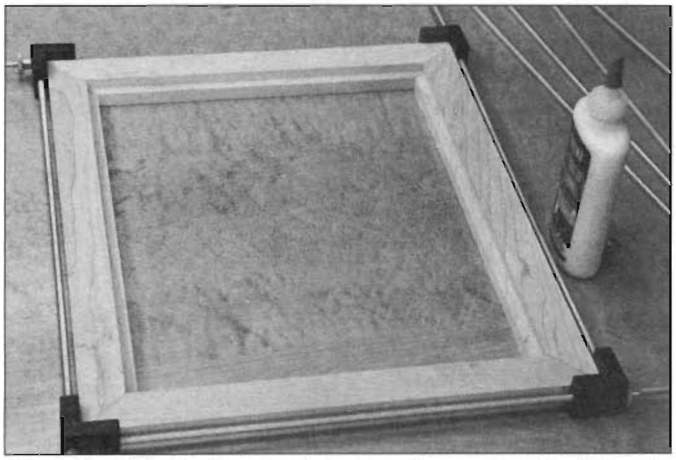
by Hugh Foster

## Some Framing Clamps

As you may have noticed, our craft frequently requires the assembling of four–sided objects. Whether we're making cabinet carcases or picture frames, many of these assemblies require something more than the basic bar clamp to hold them together. If mitered corners are involved, you are almost sure to need a special device.

The obvious use for at least the first several of the clamps discussed here is picture framing, though they may indeed be used for other larger four–sided and mitered units. The last clamp mentioned is designed more with larger jobs in mind—carcase units and the like. Each of them, in its respective price range, represents a good value.

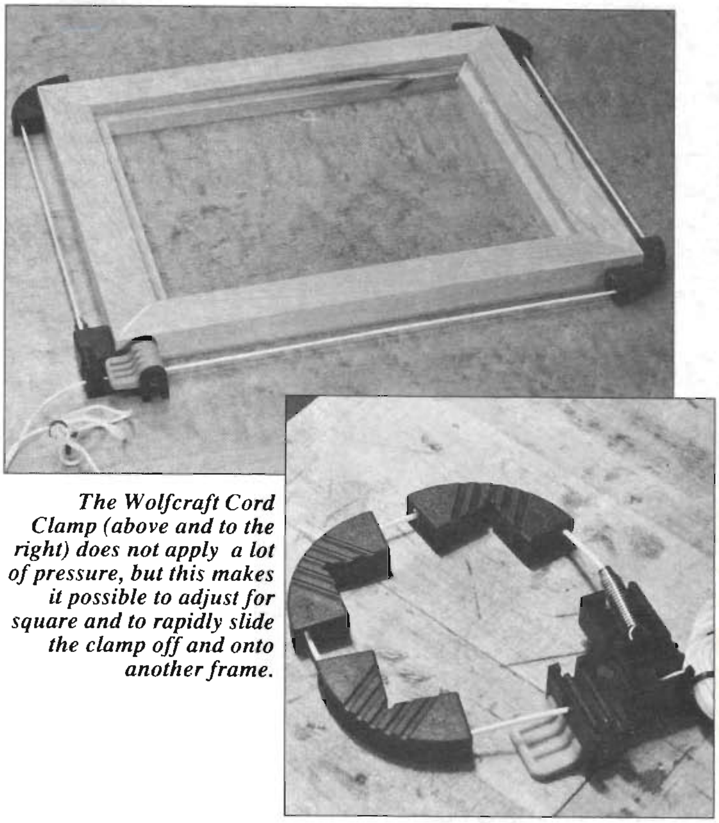
The model 9448 "Pony" Four Corner Framing Clamp from the Adjustable Clamp Co. consists of four corners, four connectors, four finger–nuts, and eight pieces of 1/4" X 24" threaded rod. The concept behind this clamp is an excellent idea, particularly if you have lots of work that is nearly the same size. In theory at least, the threaded rod is easier to work with than the wired, corded, or banded clamps; in practice, it can mean lots of fooling around. However, given a production run of frames, this will be the clamp that I'd want to use because its use of rods makes it hold its shape far better than do any of these that follow.



*The threaded rods allow the Pony Four Corner Framing Clamp to maintain its shape for mass–producing frames that are all the same size.*

photos by the author

The 3417 Wolfcraft light–duty cord clamp features a two–meter long piece of spring–loaded cord (heavy string, really), four square corners, and a cam–action stopper. I really like the action of the cam clamp here; unfortunately, the string has so much "flex" in it that the clamp cannot be made to stay even "finger tight." Since miter joints are only as good as we cut them, regardless of how tight we clamp them, maybe this relatively loose fit isn't a problem. I found that I was able to tinker with the fore–and–aft fit of my miters in this clamp, unlike some of the others. After the day's framemaking was done, I was hard–pressed to tell which frames had been clamped in which clamp. In other words, the least expensive framing clamp you can find will do, and this Wolfcraft 3417 is the least expensive framing clamp I could find!

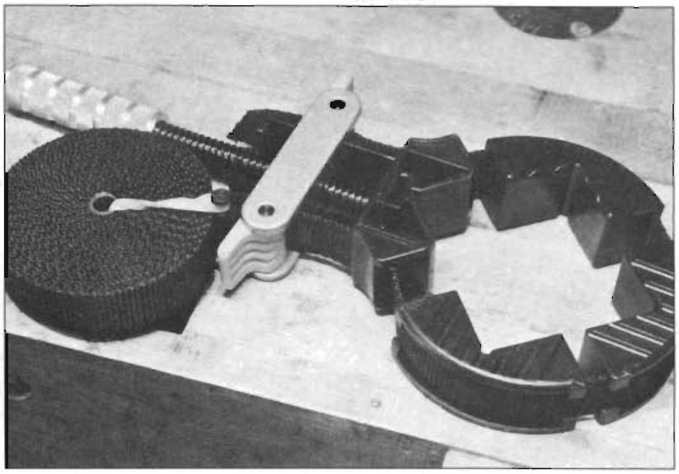


*The Wolfcraft Cord Clamp (above and to the right) does not apply a lot of pressure, but this makes it possible to adjust for square and to rapidly slide the clamp off and onto another frame.*

The more expensive 3416 Wolfcraft Belt Clamp does only what those already described do, but it does it more quickly and more tightly. This stronger clamp features two cam–tightened belt positions, and a tightening screw to be used only after the four–meters—long web is pulled as tight as possible and cam–locked in place. If it's important that your framing clamp be light and easy to use, as well as have a pretty powerful clamping action, this may be the clamp of choice. I know I'd like to have a couple more of these in my shop for occasional use.

This belt clamp is similar to my old Jiffy Clamp, a metal clamp with adapters for curved or molded surfaces that uses 3/16" wire instead of a belt. The wire is drawn tight with a standard turnbuckle. The only real drawbacks to the Jiffy Clamp are that I have scratched a couple of frames while tightening the

*The Wolfcraft Belt Clamp is light and easy to use.*



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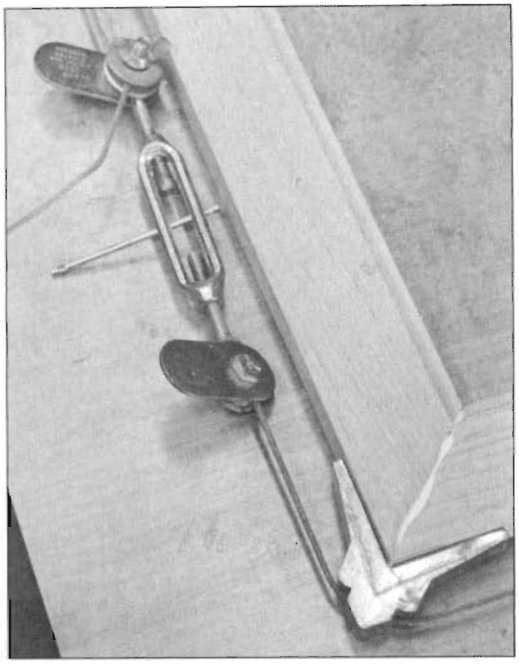
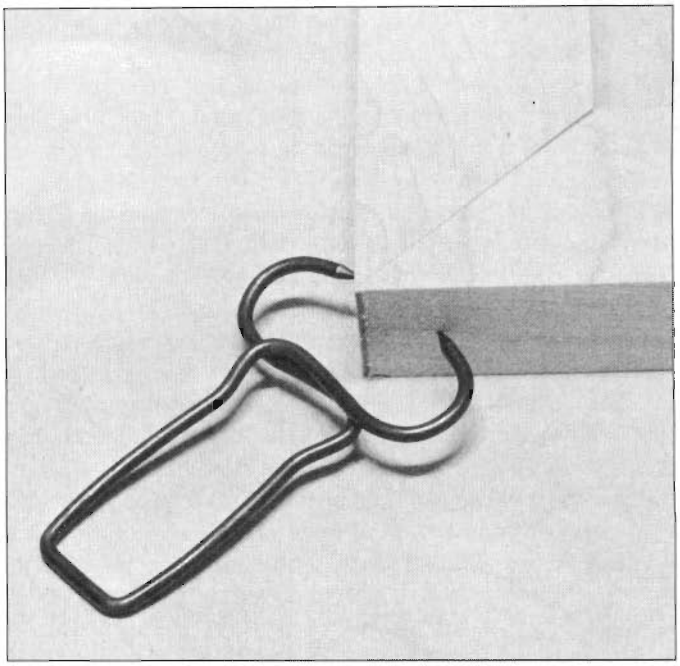
*When he's not pursuing freelance writing or teaching English,* ***Hugh Foster*** *designs and builds custom furniture in Manitowoc, Wisconsin.*



*The Jiffy Clamp's wire cable is drawn tight with a turnbuckle.*



*Finger Spring clamps pinch the corners of a frame together.*

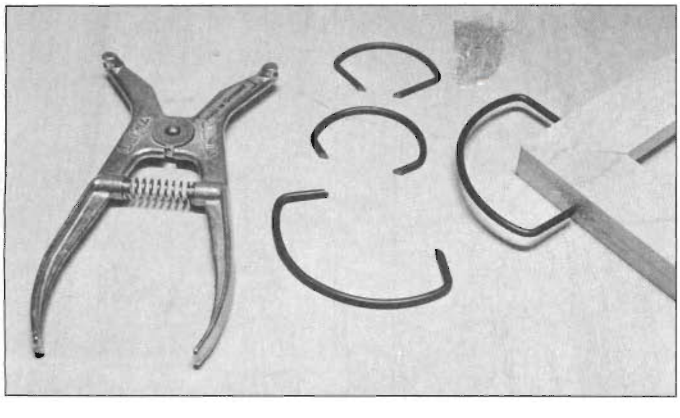
turnbuckle, and the wire tends to become somewhat distorted, especially after it has been excessively tightened a few times. On the other hand, it will span a 25' perimeter. The Jiffy Clamp has been the "old standby" framing clamp in my shop for the past decade or so, and I believe its strength matches or exceeds the Pony's and beats both the others handily if only because wire, like threaded rod, doesn't stretch.

The Spring Miter Clamp Set is made in Germany by Ulmia, a company that exemplifies German precision craftsmanship. If one made lots of frames, as in a professional framing shop, this set would be good to have, particularly if one used lots of large, heavy frame stock. These clamps grab the right size frame very tightly and hold it well. The small scars these clamps leave are not a problem, especially if you use brads in your mitered joints as many framers do. The six available sizes of clamps will handle frame stock that ranges from 3/8" to 3-1/2" wide. If I made more than half a dozen frames a year, you can be sure I'd want to add this fine clamping system to my arsenal.

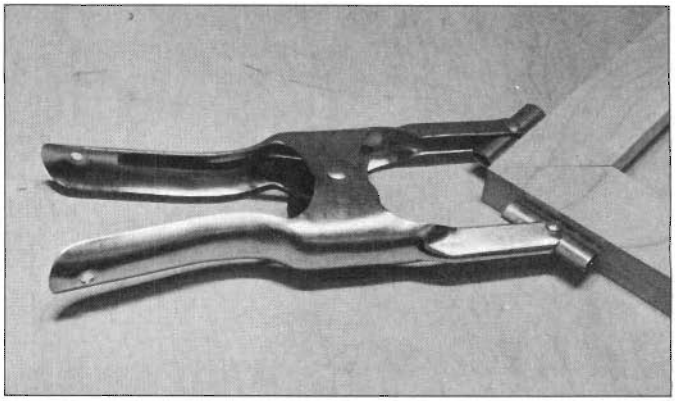
While the spring miter clamp set is a fast, powerful, professional system, the Finger Spring Clamps might be just the ticket for holding typical homebuilt frames made of material that is up to 1" wide. These clamps work similarly to the spring miter clamps in that they have very sharp, pointed tips for grabbing the wood. The difference is that these have the springing mechanism built in, instead of requiring a separate spreader. I don't have an accurate way to measure the strength of these springs, but I cannot fully compress the larger one with just two fingers. I'd buy the larger size since it is nearly twice as big at its maximum opening as the small version and its spring action is much stronger. Having the smaller size wouldn't give you any advantage beyond the 20 cents difference in price.

Both types of these Ulmia spring clamps are faster and easier to use than any of the band, string, or wire clamps mentioned earlier, so they are worthy of your consideration.

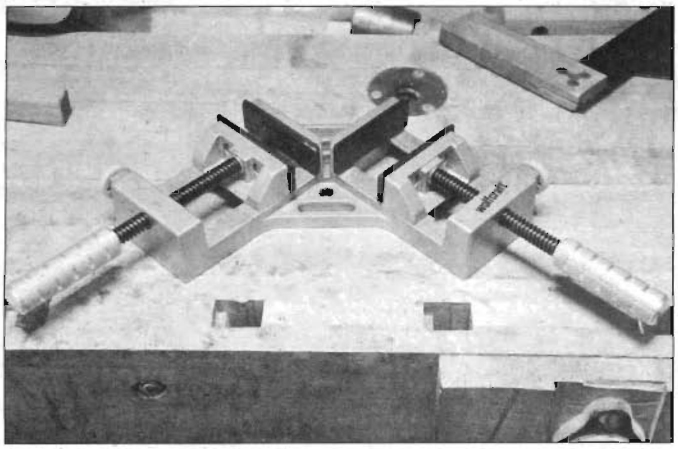
Perhaps less worthy of your attention is the Pivoting Jaw Clamp. The jaw will open to 3", and the jaw pads each have ten small sharp teeth. A set of four would be required for most framing applications; $26 (at $6.50 each for three or more) would put this in the more expensive range of framing clamps. These jaws did more damage to my sample frames than did all



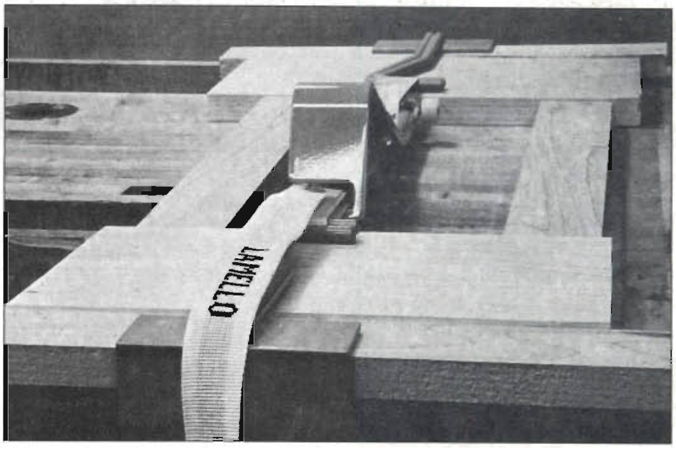
*The Spring Miter Clamp Set comes with a spreader tool for applying the clamps.*



*The Pivoting Jaw Clamp has ten small teeth to grip the work.*



*The Wolfcraft Miter Vise features quick–action jaws for rapid assembly of mitered joints.*



*Clamping flat assemblies is quick and easy with the Lamello Spanner Set.*

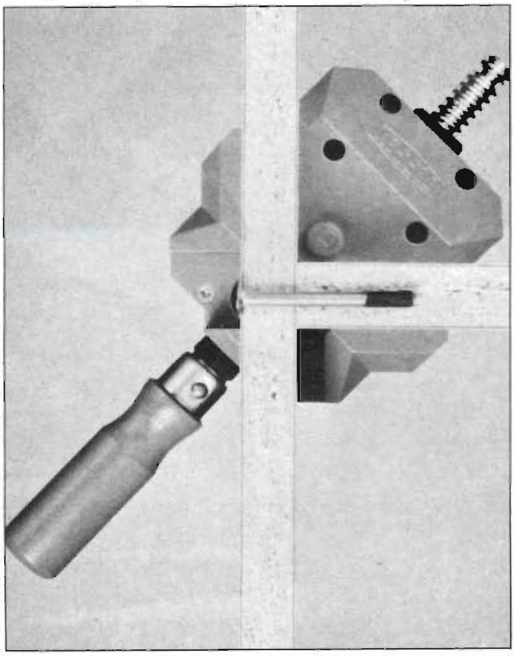
of the other miter clamps combined. Perhaps a single use shouldn't be enough to generate this negative comment, but it was enough to convince me that I don't really want to use it again.

Next in this line–up is the 3415 "mobile clamp," as Wolfcraft's packaging calls it. These aluminum clamps are especially well made, featuring steel jaws (or the option of replacing them with softer liners if you prefer) and push–button screw releases for rapid gluing, assembly and nailing of many types of joints. I wish every clamp I owned with a screw in it had this quick–adjust feature; it alone differentiates this clamp from all those others that merely look like it. Some catalogs call it a "Rapid–Action Miter Vise." This might be a better name, for at $38.50 (or more) each, four of these would be an awfully expensive way to join the four corners of a picture frame, especially when it won't really do it any better than any of the others. It will, however, do other things the others won't. A careful worker could even saw in it if he needed to adjust the fit of his miter.

At first glance, Bessey's WS-3 and its larger cousin, the WS-6, look as though they function very much like the Wolfcraft clamp just mentioned. Indeed they do, but without the quick–action vise. Otherwise equal in versatility, these clamps (like the Wolfcraft) are sufficiently expensive to warrant their use only as an assembly tool in carcase construction, rather than as a clamp for picture frames. I believe the Wolfcraft's quick–action clamps will save sufficient time to warrant the few dollars of extra expenditure.

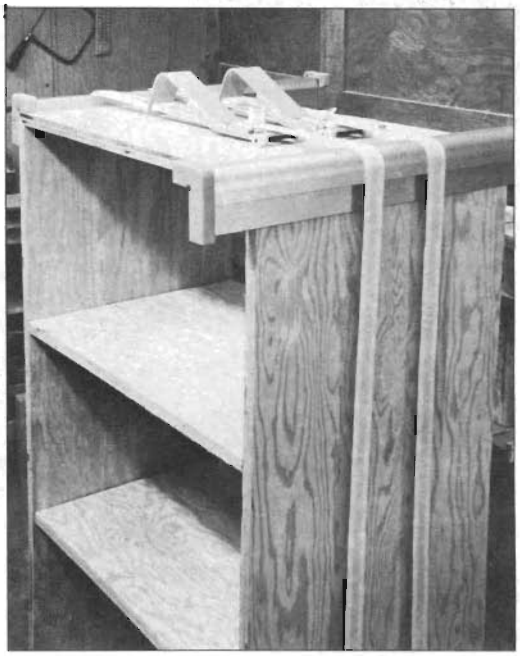
The Lamello Spanner's price might prevent your interest, but this is a clamp that will permit you to do assembly jobs alone that you've never been able to do alone before.

I have had a spanner set for only a few months, but I can see that it presents certain advantages over other clamping methods. For carcase work, it is much handier than using pipe clamps; it is certainly lighter in weight if you want to move the case. To use it in carcase construction, simply set the "bottom" of your project in the extrusion with sufficient webbing to span the unit hanging out. Assemble the carcase. Set the remaining pair of



*The pivoting jaw of the Bessey WS-3 permits clamping of pieces that are different thicknesses.*

photo courtesy of American Clamping Corporation



*The Lamello Spanner Set includes aluminum extrusions that fit on the corners of a carcase.*

extrusions on the "top" joints and "set" the clamp lightly. After the final adjustments for square have been made, tighten the clamps. It can easily be done while working alone, and it helps ensure that your joints are all drawn tight. Nothing could be simpler; certainly, I'll hope to never have to be bar clamping in several different directions again.

At first the spanner set seems less handy for flat clamping. However, it really works well for that, too. A standard pipe or bar clamp can move the work slightly by torsioning it clockwise as it is tightened. The spanner set does a better job of maintaining the work flat and square.

Those things are positive. This next point is less positive. Glue squeeze–out isn't usually much of a problem with standard clamps; we expect them to get glue on them, and we let it dry and chip it off. In this respect, some gluing habits will have to change. The webbing of the Lamello spanner kit doesn't want glue all over it. If you are using the spanner with plate–jointed assemblies, there need be little if any seepage. For other joints, learn to use less glue.

## Table of Hopper Joints

### by Don Kinnaman

Real works of art often have frames that are real works of art. Some craftsmen make a business out of picture framing, buying special profile cutters for their planers or cutting frames from commercially available moulding stock. There's more to it, though, than cutting accurate 45° miters. The more interesting frames are made with compound miters—also called "hopper" joints because the pieces are angled like the square funnel on a grain hopper.

Listed in the chart below are the arbor tilt and miter gauge settings required to cut compound miters that allow the frame members to flare out from the wall, but still come together with 90° corners. A magnetic base protractor can be very helpful in setting up to the accuracy required. PW

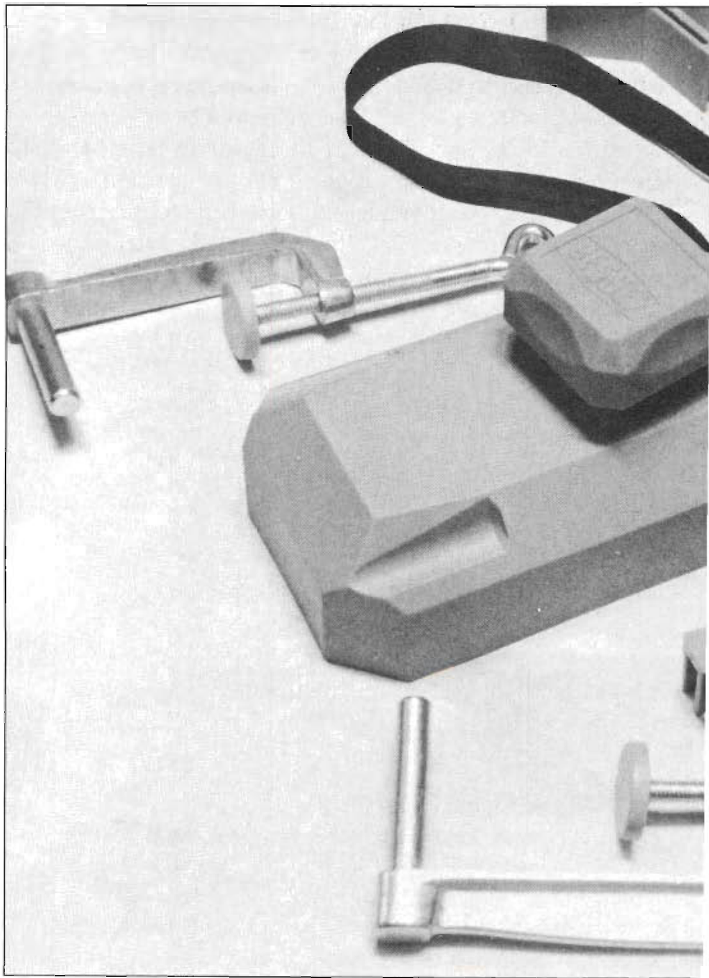
| Slope | Arbor Tilt | Miter Gauge |
|---|---|---|
| 5° | 44$^3/_4$° | 85° |
| 10° | 44$^1/_4$° | 80$^1/_4$° |
| 15° | 43$^1/_4$° | 75$^1/_2$° |
| 20° | 41$^3/_4$° | 71$^1/_4$l° |
| 25° | 40° | 67° |
| 30° | 37$^3/_4$° | 63$^1/_2$° |
| 35° | 35$^1/_4$° | 60$^1/_4$° |
| 40° | 32$^1/_2$° | 57$^1/_4$° |
| 45° | 30° | 54$^3/_4$° |
| 50° | 27° | 52$^1/_2$° |
| 55° | 24° | 50$^3/_4$° |
| *60° | 21° | 49° |

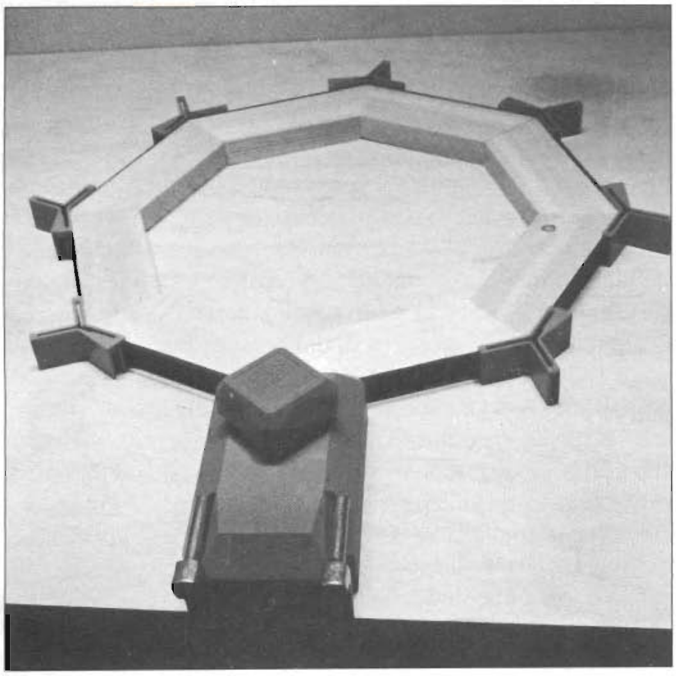
* most popular slope for picture frames

So, here is a clamping system that may replace eight or more pipe clamps in carcase construction. Suddenly it seems less expensive.

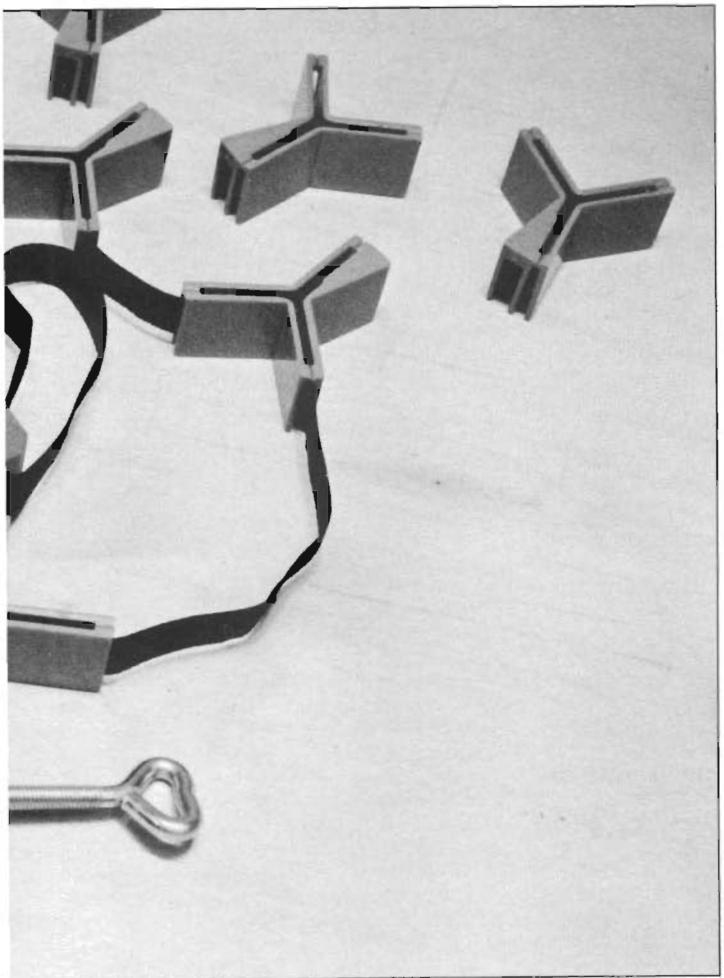
I bought the full kit, and I will be adding the 5" corner protectors, as I expect to be building quite a few storage units for compact disks over the next several months, and that will make their construction easier. While I can't present this to you as an economical tool, the full kit will save you the most in the long run. Certainly you could get along without it—as no doubt I could. But I don't want to, even if it won't fully replace most of the framing clamps mentioned earlier in the article.

The Bessey Poly–Angle Strap Clamp is the ultimate framing clamp for projects not much over twenty feet in circumference. For starters, it's better made than any of the other lightweight clamps. The manufacturer claims that the woven polyester fiber strap has 400 pounds of tensile strength. The polycarbonate body can be clamped into place for easier working. And the corner pieces are designed for assembling rectangular, hexagonal, and octagonal shapes. These corner pieces are easily assembled to the strap, but the strap can be used without the corners for clamping shapes with even more sides. There is a ratchet in the main body of the clamp which has three positions.





*The Bessey Poly–Angle Strap Clamp's corner pieces are shaped in such a way that, depending on how they are fitted on the strap, they will clamp four–, six– or eight–sided objects. The base itself can also be clamped to the work surface.*



photos by the author

The upper position is for tightening the slack in the strap; the lower position applies final clamping pressure; and the middle position is for pulling out the strap. The ergonomic features of the clamp show that the designers have paid attention to what really goes on in a shop. While I was experimenting with this clamp, I cut a quick octagonal frame and used this to assemble it. Never before has assembly of such a project been so easy. Bessey's reducing the list price from $72.95 to $49.95 has made having it realistic for most shops. After an hour's experimentation with it, I knew I liked it well enough to reach for my checkbook. **PW**

## Where to Get Them

The clamps mentioned in this article are listed below in the order in which they are discussed. Following each are letters which correspond to the legend below to indicate mail order distributors of the clamp or, in some cases, the manufacturers who can then put you in touch with a local distributor.

Pony #9448 Four Corner Framing Clamp: **A**
Wolfcraft Cord Clamp #3417: **F**
Wolfcraft Belt Clamp #3416: **E**, **F** and **G**
Jiffy Clamp: **H**
Spring Miter Clamp: **G**
Finger Spring Clamps: **G**
Pivoting Jaw Clamp: **G**
Wolfcraft Mobile Clamp #3415: **D**, **F** and **G**
Bessey #WS3: **B**, **D**, **E**, **H** and **I**
Bessey #WS6: **B**, **D**, **E** and **I**
Lamello Spanner: **C**
Bessey Poly–Angle Strap Clamp: **B**

### Legend

**A** Adjustable Clamp Co.
417 N. Ashland Ave.
Chicago, IL 60622
(312) 666-0640

**B** American Clamping Corp.
P. O. Box 399
Batavia, NY 14020
(800) 828-1004

**C** Colonial Saw Co.
P. O. Box A
Kingston, MA 02364
(617) 585-4364

**D** The Fine Tool Shops
P. O. Box 7091
Portsmouth, NH 03801
(800) 533-5305

**E** Lee Valley Tools
1080 Morrison Dr.
Ottawa, Ontario K2H 8K7
Canada

**F** Wolfcraft of America
1107 Lunt Ave. #6
Schaumberg, IL 60193
(312) 893-7266

**G** Woodcraft Supply Corp.
P. O. Box 4000
Woburn, MA 01888
(800) 225-1153

**H** The Woodworkers' Store
21801 Industrial Blvd.
Rogers, MN 55374-9514
(612) 428-2199

**I** W. S. Jenks & Son
1933 Montana Ave. NE
Washington D.C. 20002
(800) 638-6405

# Coloring Wood

### by Thomas Wisshack

There are a lot of good reasons to color wood, and just as many ways to do it. When restoring antiques, you often have to match the color of a replacement part to the rest of the piece. If you're refinishing the whole piece, a light stain can help it retain the look of an old surface, rather than one newly refinished. Newly made furniture can be enhanced by the use of color, too, whether you use commercial stains, dyes, or concoctions of your own.

Many of the customers that bring old furniture into my shop for refinishing cringe when they hear the word "stain" in connection with their pieces. They've probably seen some ghastly results, or have had a bad experience of their own using stain, so I've stopped using the word in front of people (even though nearly every piece that leaves my shop goes through a staining process). Instead, I now call it a "wash of color."

Whenever an old piece has been stripped and sanded down, it loses a lot of its character. By staining I can give the piece a rich patina, yet the customer is convinced he is looking at a natural finish. The same technique can be applied to newly made furniture by studying the colors that are already present in the wood and mixing up a solution that will enhance them. By making your own stains, you have a better chance of getting exactly the color you want.

The oak highboy at right was given a wash of color in order to bring out the golden tones of the wood. To create this look I used pure mineral spirits, boiled linseed oil, artists' oil colors in tubes and Japan drier. Begin by mixing roughly four parts mineral spirits to one part linseed oil with a few drops of Japan drier (about 5% by volume). It would be safest to begin with a pint container because you will need to do some experimenting in order to get the color you want. Squeeze a small amount of cadmium yellow and about half as much burnt umber into the liquid and stir. Then add a very small amount of cadmium red (the mixture should take on a slightly orange hue). Deepen the tone by adding a little black. Try the mixture out on a piece of scrap wood to get an idea of its intensity. Apply it with a brush, let it soak in for up to fifteen minutes, and then gently wipe it off with a soft rag. Notice the effect the wash has had on the wood and make any adjustments you might need to get the color you're after. Small amounts of any of the raw colors can make a dramatic difference in the tone. If it appears too orange, try adding burnt umber until you are satisfied. If you accidentally put in too much red, don't panic; mix in some green in small amounts until a rich brown results. You can then add whatever colors are lacking to get the color you want. If the mixture seems watery and has little effect on the wood, you will have to add more pigment in similar proportions. If it is thick and opaque you will have to add more thinner. After your project has been sanded to perfection, apply a liberal coat of the mixture with a brush. Let it soak into the wood for up to twenty minutes (the wash will begin to haze and become dull in places). Gently distribute the stain with a soft cloth using a circular motion. By the time you're done, you should be ready to give your piece a final, gentle

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*Thomas Wisshack is a furniture maker, restorer, and finisher in Galesburg, Vermont.*

## Mixing Stains

### by Sam Allen

Using these formulas as general guidelines, you can mix your own stains using tinting colors. Many shades can be acheived with the four basic colors as shown in the left chart. With additional colors, a wider range of effects can be achieved as shown in the chart on the right.

### Stains Using the Four Basic Tinting Colors

**Walnut**
6 oz. burnt umber

**Brown Mahogany**
6 oz. burnt umber
2 oz. burnt sienna

**Red Mahogany**
6 oz. burnt sienna

**Dark Oak**
6 oz. burnt umber
1 oz. burnt sienna
1/2 oz. yellow ochre

**Light Oak**
1 oz. burnt umber
1 oz. yellow ochre

**Antique Pine**
3 oz. burnt umber
2 oz. yellow ochre
1 oz. burnt sienna

**Limed Oak**
6 oz. zinc white
1 oz. yellow ochre
1/4 oz. burnt umber

**Natural Pine**
4 oz. yellow ochre
2 oz. zinc white
1 oz. burnt umber

**Pickled Pine**
4 oz. zinc white
1 oz. yellow ochre
1/4 oz. burnt umber

**Honey Maple**
6 oz. yellow ochre
1 oz. burnt sienna
1/4 oz. burnt umber

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### Stains Using Additional Colors

**Light Cherry**
3 oz. raw sienna
3 oz. burnt sienna
1/4 oz. rose pink

**Dark Brown Mahogany**
6 oz. vandyke brown
1 oz. raw umber
1 oz. raw pink

**Pumpkin Maple**
5 oz. burnt sienna
a touch of ultramarine blue

**Yellow Maple**
3 oz. raw sienna
1 oz. raw umber

**Honey Pine**
4 oz. yellow ochre
1 oz. raw sienna

**Weathered Silver Grey**
2 oz. lamp black
3 oz. zinc white
1/4 oz. raw sienna

**Medium Dark Walnut**
5 oz. vandyke brown

**Dark Walnut**
7 oz. vandyke brown

**Mission Oak**
3 oz. vandyke brown
1 oz. burnt umber
2 oz. lamp black

**Ebony**
8 oz. ivory black
1/4 oz. rose pink
1/8 oz. Prussian blue

**Bright Red Mahogany**
5 oz. burnt sienna
1 oz. raw umber
1/2 oz. vermillion red

wiping off with the grain, using a fresh cloth.

When making your own oil stains with artists' oil colors you will need to have some sense of color to get the effect you want, but you needn't be an artist. Trial and error will give you confidence and eventual mastery. Always remember to study the natural wood tones and base your stain on this. Look at a fine old piece of figured mahogany and you will very likely see reds, yellows, oranges, browns and even blacks. You will be using these very colors in mixing up a mahogany oil stain. I begin with a rich red, deepen it with a small amount of black, and charge it with small amounts of yellow or orange. If it appears too red, I add green to bring it back to a brown mahogany.

Sometimes because of the size of a job, or because you must have uniform results without any guesswork, commercial stains are the answer. Obviously they are much more convenient, but it pays to be aware of their limitations before using them. My main objection to these is that most companies who now make them have switched from organic to synthetic ingredients, and I believe a certain richness is lost in the process. Sometimes too, fillers are added which tend to give the wood a muddy appearance. Having said that, I must admit that there are some very fine stains on the market. One of my favorites is Minwax Wood Stain. The people who originated this product must have been aware of the dilemma that stains can present to the wood-finisher, because they have come up with a product that meets all the requirements for a superior stain: ease of application, richness, permanence and transparency. By intermixing Minwax stains it is possible to match nearly any shade of wood. This, I am sure, has made them very popular among people who restore antique furniture. The stains have a transparency that I have not seen before in a commercial product and with, for example, an old piece that has been stripped and sanded and lost some of its patina, you can again give the wood the richness that it might possess if the original finish had remained intact.

For newly made furniture these stains work equally well. Since my approach has always been to try to enhance rather than completely change the character of any wood surface, I suggest you use these stains very much as you would use the wash of color I just described. You needn't accept them just as they come out of the can; by experimenting you will get the best results. In some cases you may need to add a little thinner to your stain because some of the colors, such as their Red Mahogany and Jacobean stains, are very intense. Once you have stained a piece too dark, it can be very difficult to remove; these stains contain a certain amount of sealer and can penetrate quite deeply into the wood (more about this later). Always experiment on a scrap of the same wood from which you have made your project. The properties and working characteristics of these stains vary somewhat from color to color. Certain of the colors seem to have a slightly more cloudy appearance than others, possibly due to the addition of fillers or other ingredients. Others seem to have a remarkable transparency, and by intermixing you can usually get a very nice effect. Minwax *Golden Oak* will give you a very rich, transparent effect on new or old work, much like the color of the highboy at right. If you wish to darken the tone and move away from the "yellowish" look, you can add small amounts of *Jacobean* to it until you get the effect you want. By adding small amounts of the darker, more intense stain to the golden, transparent one, you can safely advance toward the exact color

***This Jocobean pine chest by the author was given a wash of color to bring out the natural tones in the wood.***

photos by Mike Godsil

***The golden tones of this oak highboy were brought out with a homemade oil stain. (Highboy by the author)***

*An aniline dye was used to achieve the brilliant red color on the mahogany legs of this contemporary table. (Table by the author, top of African wenge)*

you are after.

You can also spice commercial stains with artists' oil colors to get special effects or to match a specific color. Have a selection of the basic oil colors on hand and become familiar with how they effect each other. Experiment with smaller or slightly larger amounts of boiled linseed oil in the mixture, and add Japan drier accordingly to insure rapid drying, even when using a commercial stain. (Linseed oil brings out the golden tones which you may or may not want.)

Vary the amount of drying time when using oil stains. For the darkest effect, allow the stain to sit as long as you can without it becoming sticky, and wipe it off with a very gentle touch. For just a hint of color, wipe it off soon after you have applied it and give the wood a good rubbing down with your cloth.

You may have trouble when applying an oil finish over a piece that has been stained with oil colors. Sometimes the stain will dissolve into the finish with disappointing results. You can avoid the problem by first isolating the stained piece with a wash coat of shellac, which will usually not disturb the color. Shellac is available in spray cans, and a light coat misted onto your project and later smoothed lightly with steel wool allows you to apply an oil finish without worry. Most finishes will bond to the shellac, as long as it is applied thinly.

In some cases you may be leery of applying a stain directly to the wood because of blotchy or uneven results. Applying a sealer to the wood first and rubbing it down with fine steel wool when dry, will give you more control over the final color. You could use shellac or one of the penetrating finishes for this. Many craftsmen have trouble when working with pine, which is sometimes a difficult wood to stain. One way to get a soft, mellow, old look on pine is to first give it a wash coat of shellac.

photos by Mike Godsil

*An aniline dye produces dramatic effects on wood; these water-soluble dyes will, however, raise the grain of the wood .*

White shellac that has been spiced with a little orange shellac does a very nice job of it. You may want to use two coats, but be sure you have thinned it considerably with alcohol to avoid a gummy build-up. Afterwards you can apply your stain and leave as much or as little as you like on the wood. I have given new pine the look of 100–year–old–stock using variations of this method. Again, studying the tones already in the wood (which in the case of pine are oranges, yellows, reds and browns) will give the richest results.

I should mention that a number of commercial stains combine the pigment with sealers so that you are in essence sealing and staining the wood simultaneously. These are becoming increasingly popular, and there are some good ones on the market (including Minwax) which have ingredients in the correct proportions to give good results. But technically, the staining operation is best viewed as a separate step in the finishing process, one that should be allowed to dry completely before proceeding, so that the finish can cure properly. Many of the products I have seen, which claim to combine the two steps, give a greasy look to the wood and can emphasize the open pores in a wood like oak to the point where they look unnatural and bizarre.

So far I have been talking exclusively about oil stains, and for very good reasons: I think they are the easiest to use and give good results to even the amateur wood finisher. With oil, you know exactly what's in the mixture and you can mix up a very small amount, if the job calls for it. I would not want to be without them as a wood finisher. At the same time, I am aware that for some very special jobs, oil stains may not be the answer, so I want to talk a little about another approach to coloring wood.

Water–soluble aniline dyes are considered by many to be the finest wood stains available. The difference between a dye and an oil stain, in simple terms, is that with an oil stain, particles of finely ground pigment are suspended in a clear vehicle (mineral spirits and oil in the case of the stains/washes I described). At its very best, a mixture like this will give you a semi-transparent film of color. In its thickest form (roughly equal to an ordinary commercial stain), it will leave a semi-opaque film or color on your wood. An aniline dye, on the other hand, is made up of a very finely ground pigment, which when dissolved in water will give you a completely transparent, brilliant effect. There is another difference between the two: A water-based stain will raise the grain of the wood; an oil stain will not. For this reason, I use dye on very few of the pieces I make or restore. A piece of furniture with carving, or with a lot of moldings or hard-to-reach places, is probably not a good candidate for water–based dyes. For a piece of furniture with relatively flat, unbroken surfaces, however, it can give striking results. As an example, look at the small end table on the previous page. Here a mahogany frame and legs have been combined with an African wenge top. The table called for a special staining approach, because the mahogany appeared quite pale and lifeless at first. I wanted to play up the contrast between the two woods, which meant enhancing the color of the legs and frame. A red mahogany aniline dye provided the answer to this problem.

To create the same effect, first raise the grain of your wood by sponging it with hot water. After it's dry, sand it thoroughly to remove any roughness. Repeat this process a second time and sand your wood to perfection, finishing up with #400 or #600 wet or dry paper. The idea is to minimize the amount of grain-raising that will occur when you finally apply the stain. For maximum penetration of the dye, boil some water and place it in a glass container. Add the powdered red mahogany dye to this in small increments, testing it frequently on identical scrap wood until you have the desired shade. Flow a generous coat onto one area of your project at a time and immediately wipe the surplus off with a fresh, soft cloth. Continue this way until everything is covered, being careful not to overlap one area onto another. You can add a second coat, if you find it necessary, in about thirty minutes. Any roughness can now be removed with a worn piece of #400 wet or dry paper or fine steel wool, used with care. If you rub through a corner or an edge, it can be fairly easily touched up with a small amount of dye on an artist's brush or cloth.

You can create some very beautiful effects on wood by intermixing the dyes, and I believe they are as permanent and fade-resistant as any stains. Interestingly enough, the dye I used for this experiment was one commonly available in stores for dyeing fabrics. I see no reason why you shouldn't experiment with this kind of dye, since it is readily available and cheap, and as far as I know, the effect is permanent. Of course you should realize from the start that any dye or stain will, over the years, lose some of its brilliance unless it is completely hidden from light. But in most cases, the wood will have aged and developed a rich color of its own.

Finally, there is a very unique way of giving wood a beautiful color, but it is one that few of us can afford from the standpoint of time. Even so, every craftsman should know about what I call "shop aging" wood. This involves constructing a piece and sanding it to perfection, but allowing it to sit around the shop for weeks or months before attempting to do anything in the way of finishing it. If, for example, you are making a piece for yourself and do not have a specific deadline, I encourage you to experiment with this technique. The grain, texture and color of wood will "soften" and mellow in time (as anyone familiar with antique furniture knows) and by giving the wood a period of time to acclimate, many of the problems associated with staining and finishing are eliminated. In a sense you are letting the wood get a bit of a patina before you apply anything to it, and in every case, you will be rewarded by the extra time allowed.

Pine, a wood many craftsmen seem to have trouble with, indeed to misunderstand, will benefit greatly from being allowed to stand a few weeks in the shop. The tendency for it to appear blotchy or "anemic" when staining or finishing will be lessened considerably. Maple, in the same way, becomes "friendlier" after a period of shop aging, though it often takes longer to see results. But the most dramatic change of all takes place in cherry, which will begin to show darkening in just a few days. To see this for yourself, try this experiment: Freshly plane a piece of cherry and apply a piece of masking tape across the grain, near the middle of the board. Let it sit around for a week or so and then remove the tape. You'll see a very distinct pale stripe surrounded by a noticeably darker, brownish-green area. Apply a coat of finish to your board to see an even more dramatic effect. The aging process occurs very rapidly with cherry; even two weeks will give you a head start on a beautiful patina. It's interesting to note, as we look at the various ways of coloring wood, that if the wood is left alone, nature itself has one of the best solutions. PW

photos by the author

# Toys for Grownups

## Using Wood Species as a Palette

**by Ken Textor**

A project for Bryce Muir usually begins with a frantic phone call from an excited spouse saying, "At last I've found something that I know he doesn't have." "And what did you have in mind?" answers Bryce patiently. Psychology can be as much a part of his business as woodworking, as he tries to discern the true personality of a potential client. "I'm not sure, but he certainly loves skiing," the caller says, and then pauses for a moment. "And his dog. It's a black Lab."

With this, Bryce's wheels start turning, and he at once sees the project—a black Labrador on skis—and the woods to be used—ebony for the Lab, cocobolo for the skis, maybe birch dowels for poles. "Does he have a favorite piece of clothing?" he asks. "Oh, yes, he often wears a checked vest," she says. Bryce now sees that the Lab will need to be dressed in a checked vest—a tricky proposition, but perhaps with some padauk and Osage orange glued together in a crisscross pattern... It will be tough, but Bryce's self-imposed rules against using any stains, painting, or veneers make it neccessary.

Bryce may next try a shot in the dark: "He doesn't play a musical instrument by any chance, does he?" "He used to play the guitar in college, but not much anymore," comes the answer. That does it for Bryce. He suggests a vested black Lab on skis that strums a guitar when you move its tail. The customer is delighted, and Bryce has landed himself another week of work.

Bryce the Toymaker has his shop in Bowdoinham, Maine, in the front parlor of an old Victorian house. At 41, he now works full–time making toys, and "a little more than full–time" when Christmas gets near. He works exclusively in hardwoods, both foreign and domestic, including such exotics as bocote, zebrawood, rosewood, and greenheart, as well as the old standbys: oak, maple, birch and cherry. "I find myself using a lot of wenge lately because it's very good for pinstripes," says Muir. His shop is a veritable squirrel's nest of odd pieces of wood tucked away here and there.

The tools Muir needs for making the toys are the same simple, basic tools which any woodworker uses. He usually starts on the bandsaw, roughing out body parts and other major components. He also uses a lathe and a drill press to make his dowels, wheels, and gears. The real heart of the operation, however, is a sanding/grinding wheel which Bryce handles like a virtuoso playing a violin.

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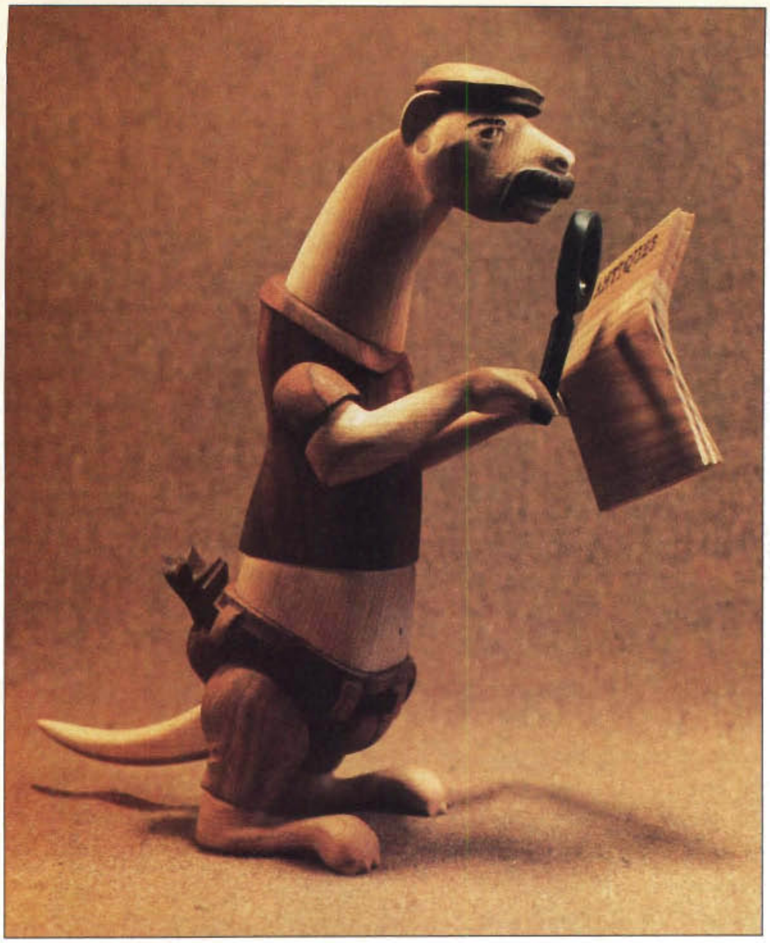
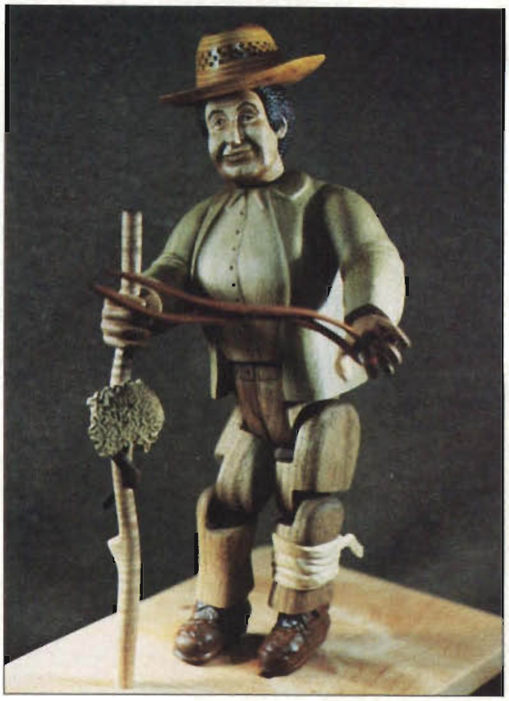
***Ken Textor** is a woodworker and writer in Arrowsic, Maine.*

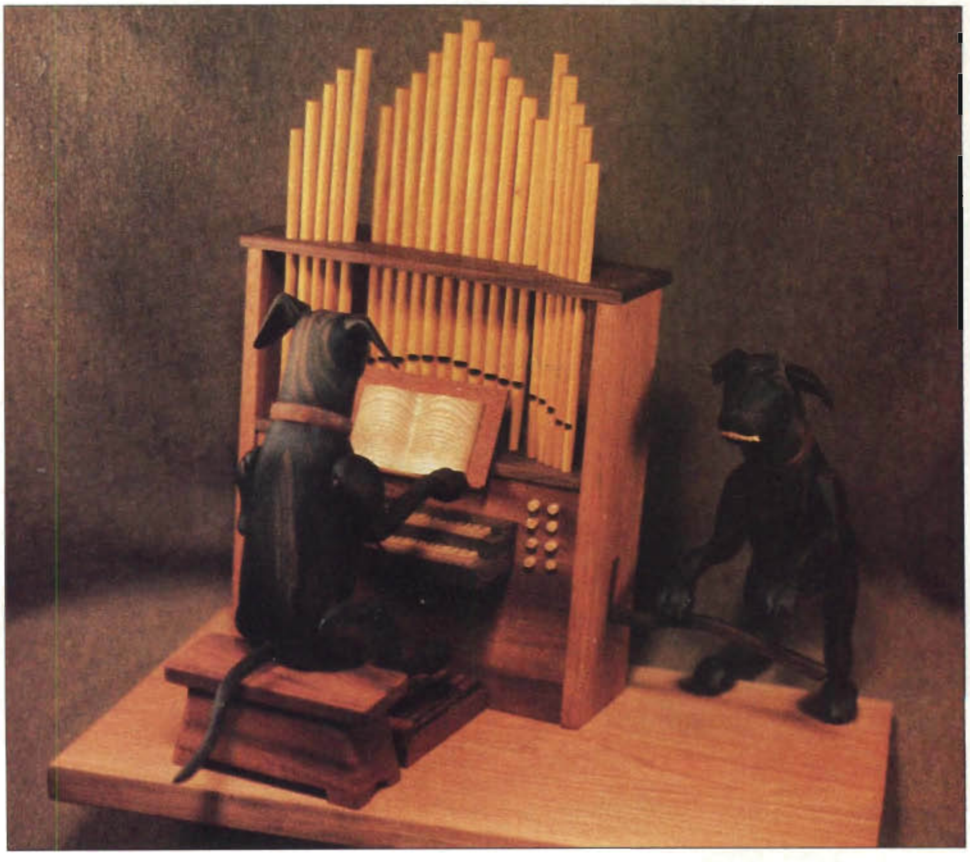


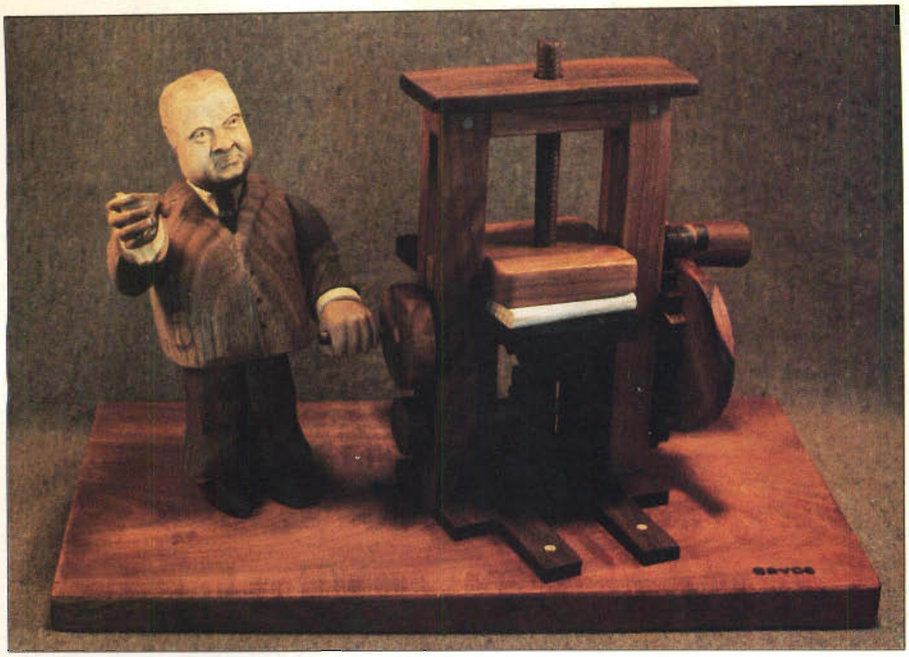
*This toy was made for an antique dealer who must "ferret out" pieces of folk art and memorabilia. When you move the ferret's tail, he "reads the fine print" of an antique catalog.*



*This was made for a hiking grandmother who never hits the trail without her walking staff, straw hat, and a fluttering ribbon in her hand.*

*When the tail of the dog on the right is turned, he cranks the organ and causes the other dog to "play" it with his feet and hands.*



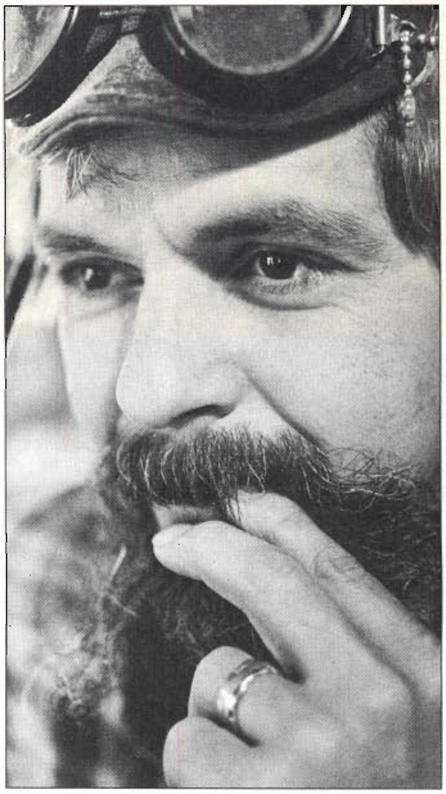


*The newspaper publisher for whom this toy was commissioned likes to offer a toast now and then; when you turn the crank, he offers one while cranking the press.*

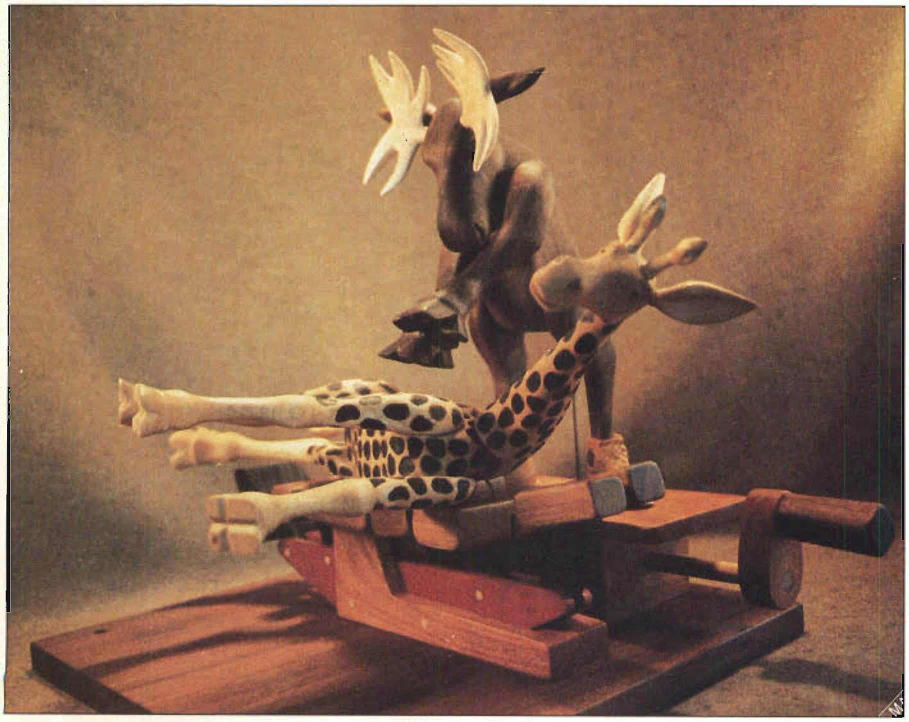
After roughing out a piece, Muir will use the wheel to sand in subtleties such as facial expression, folds of clothing, and so on. For finer work, he uses a small grinding tool, and tiny files and chisels. He finishes the toys with a non–toxic oil, just in case some real kids get ahold of them and start gnawing away.

"I still make mistakes, and occasionally I have to throw a whole piece away," Muir admits. After 20 years of toymaking, however, the mistakes are few, and Muir's finished pieces look remarkably like the person or animal they are intended to portray.

Muir glues the toy's pieces together with epoxy and pegs inserted at critical stress points. The moving parts are the most difficult to assemble. "Sometimes I have to spend quite a while working with a piece to get it to work the way I want it to," says Muir. "I never know how these things will work after I think them up."


photos by the author

*This piece was made for a Maine chiropractor who will even take on a giraffe with a stiff neck. When you turn the crank, the moose (a symbol of Maine) does the back-cracking procedures.*



One of his most challenging pieces so far was for a bartender who had an affinity for racehorses. Bryce built a toy consisting of two horses, with caricature riders which, when a crank was turned, burst out of their gates and galloped through the air on strings. When the crank was turned the other way, they galloped backwards into the gates again. "It took me almost a month to perfect that," he says.

The moving parts for Muir's toys are based on either a cam, a spoked wheel, a carved gear, or a cog assembly. "Most everyone wants their toy to do something," says Muir, adding, "The more complex it gets, the more time consuming and expensive it is to produce." The cost of his toys ranges from $500 to $1,500. Considering the detail of many of the toys, many consider them a bargain. **PW**

**PullOut™ Plans**
Popular Woodworking #49
June/July 1989
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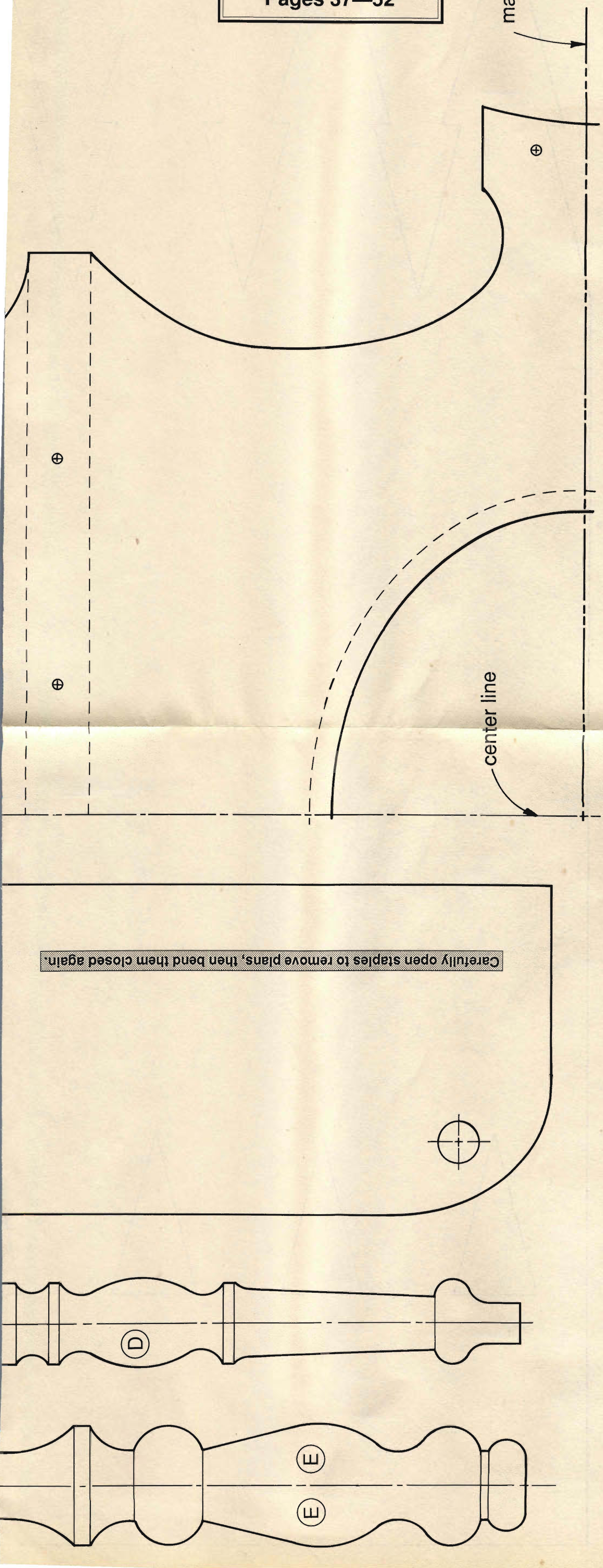

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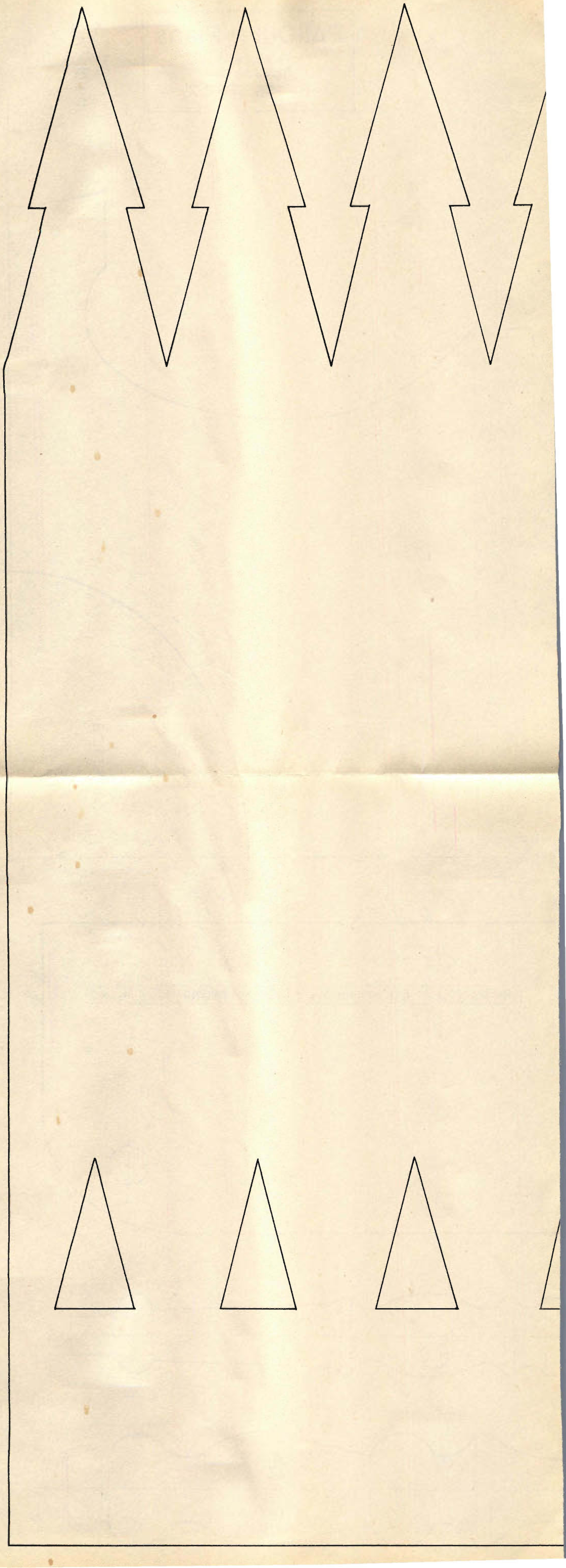

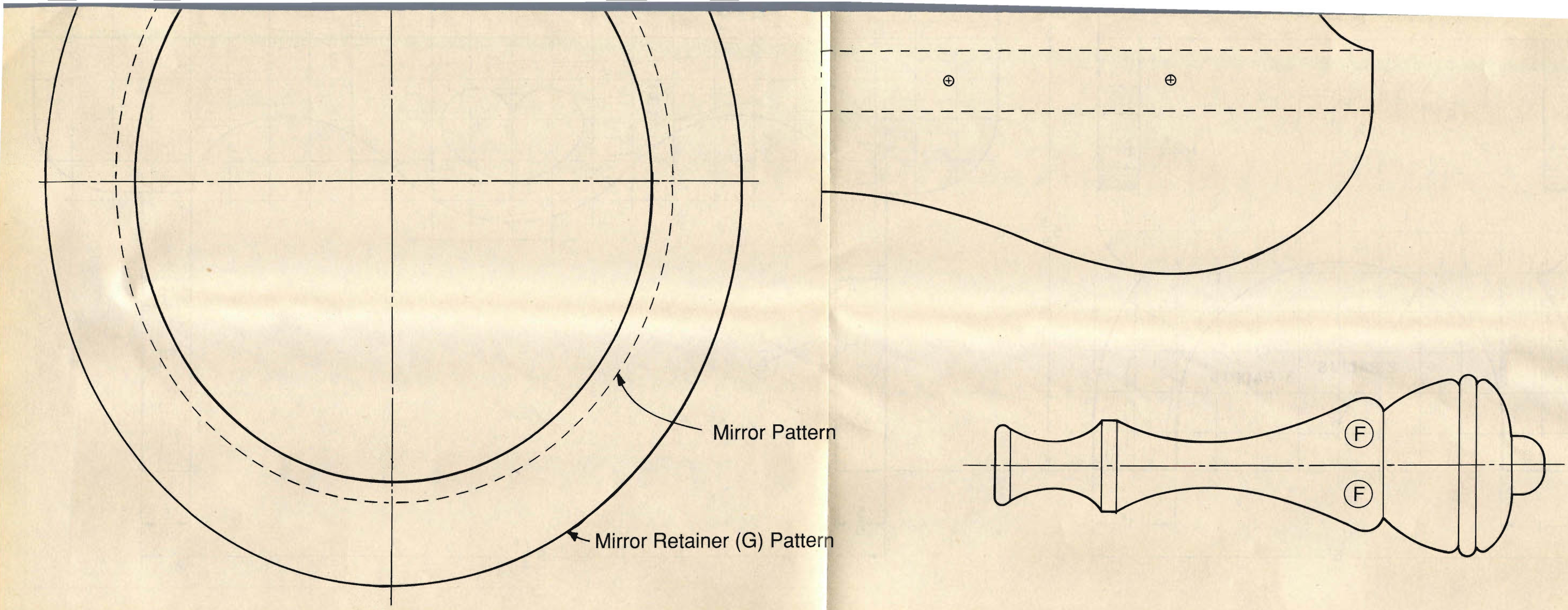
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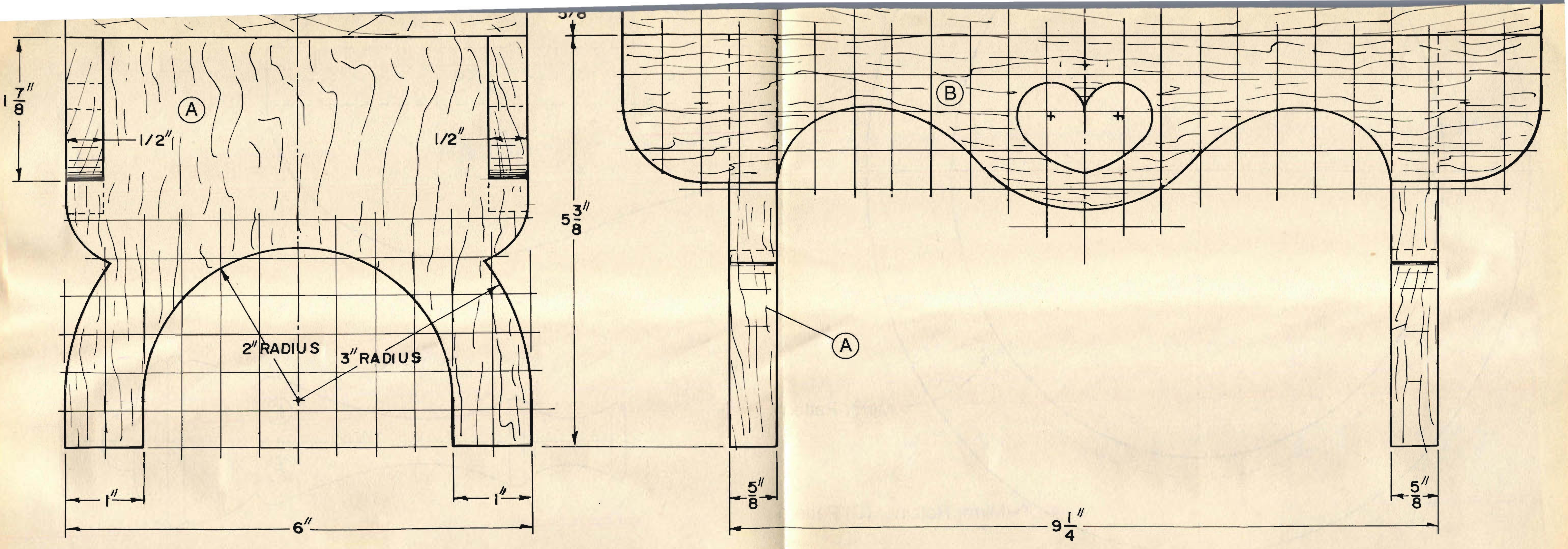
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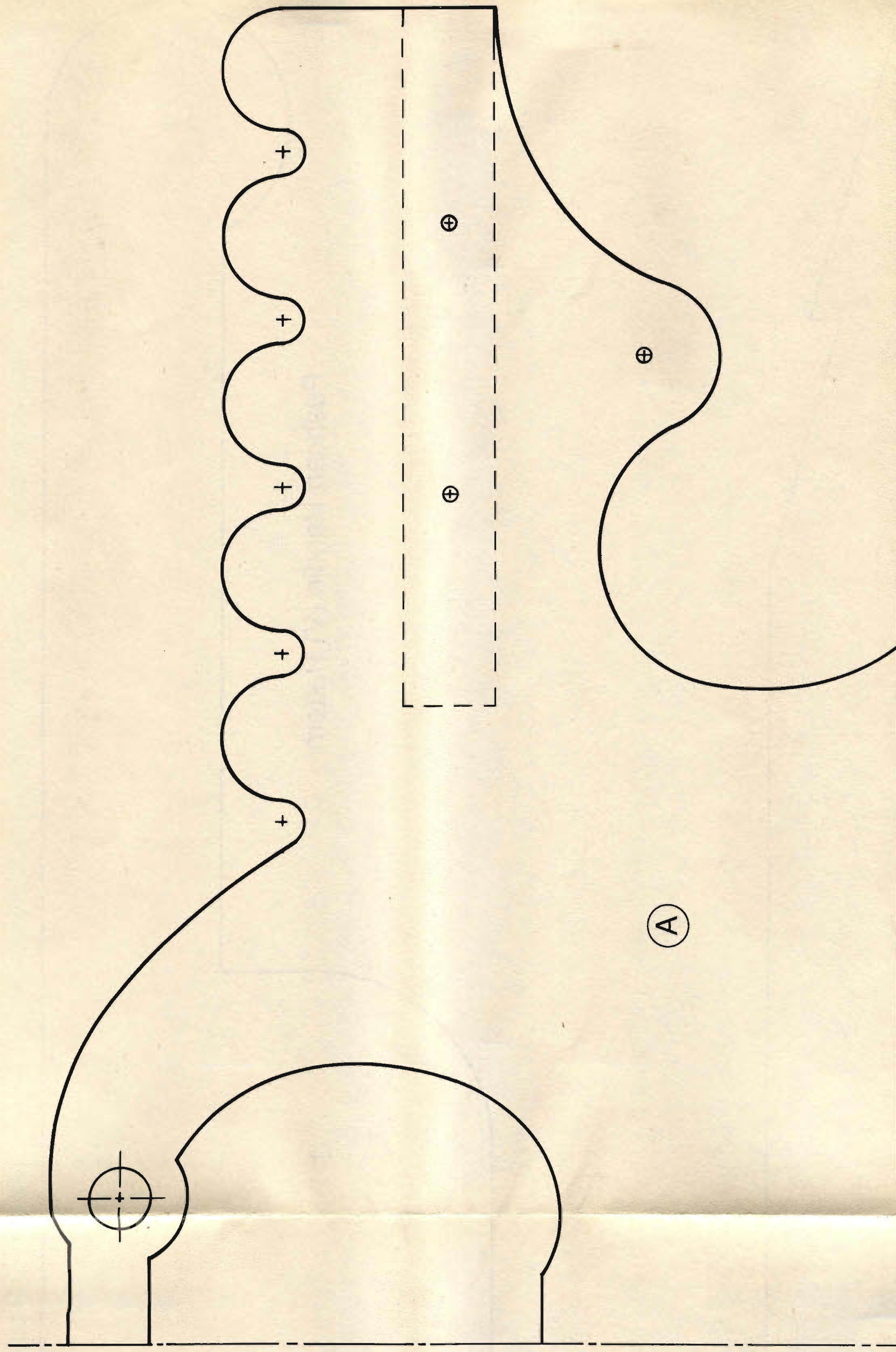
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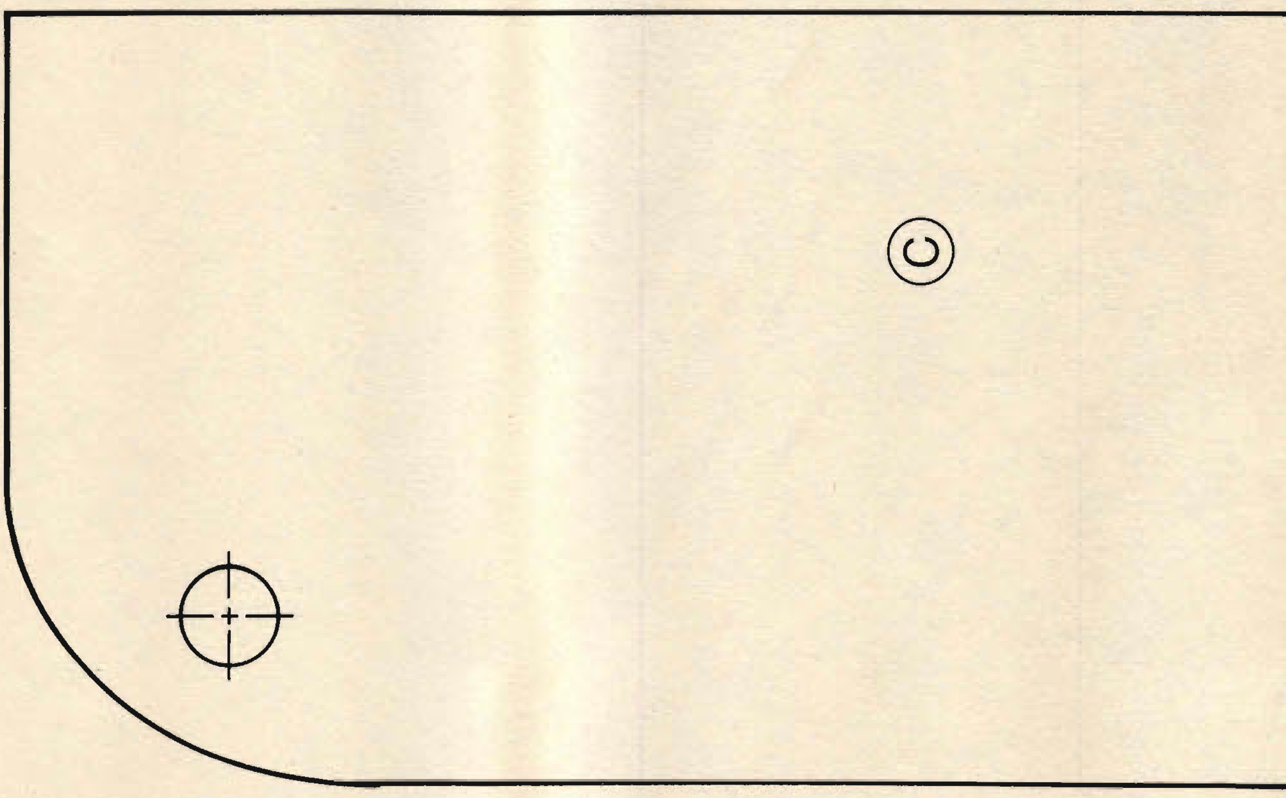
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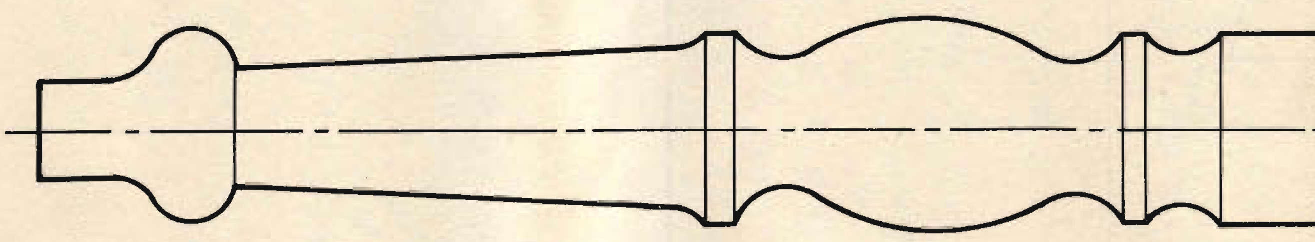
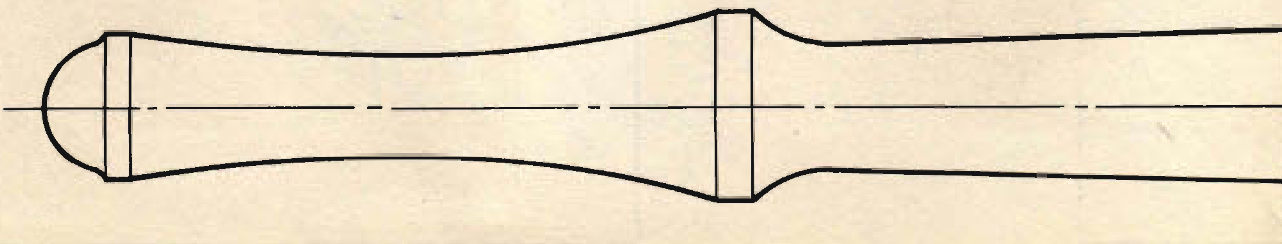
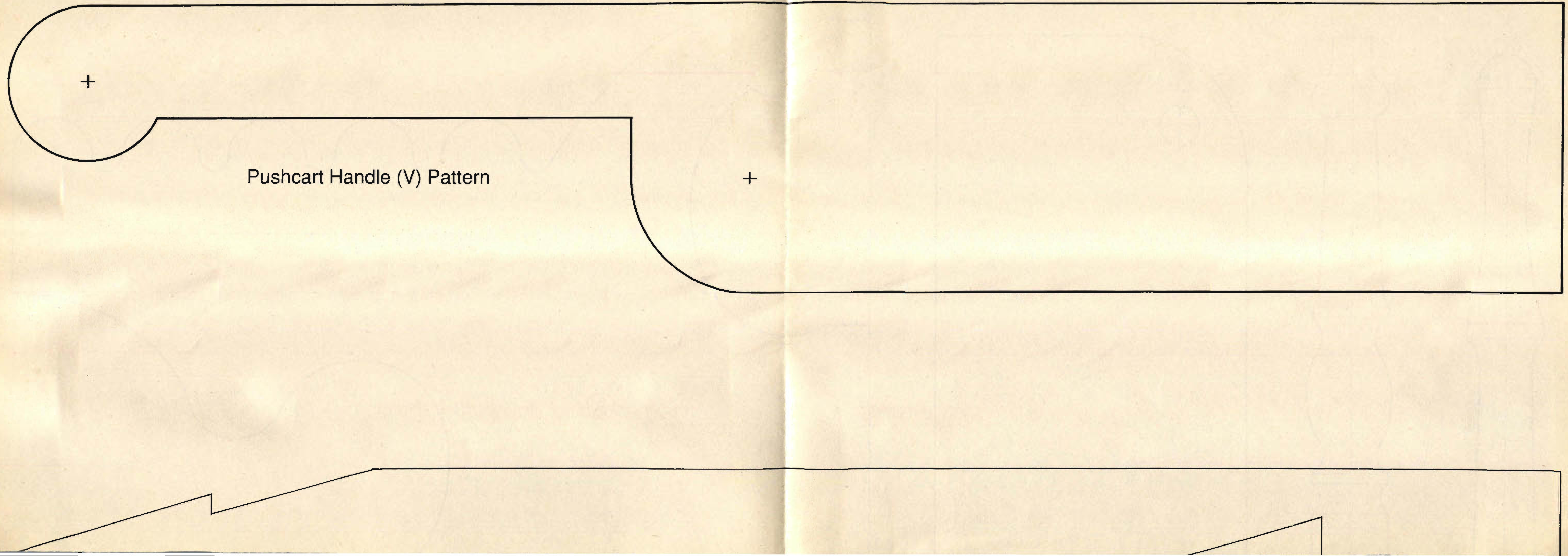
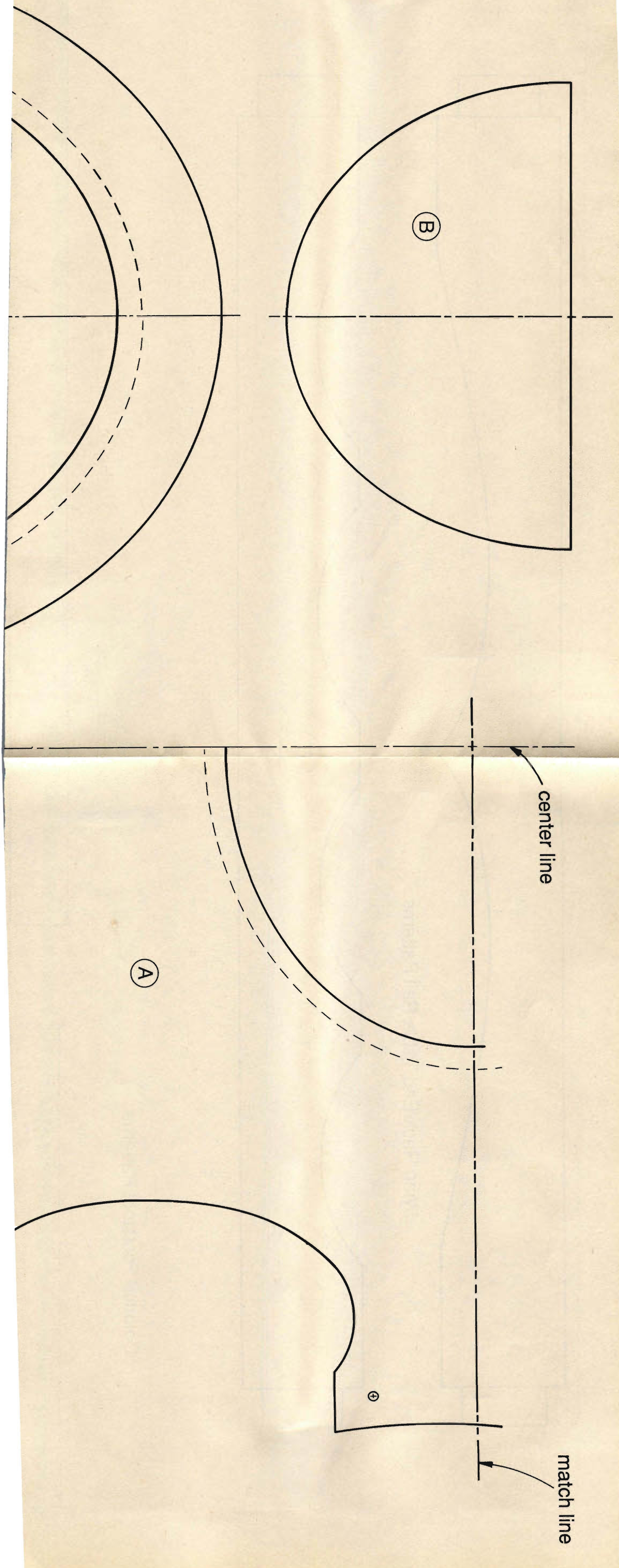






Pushcart Handle (V) Pattern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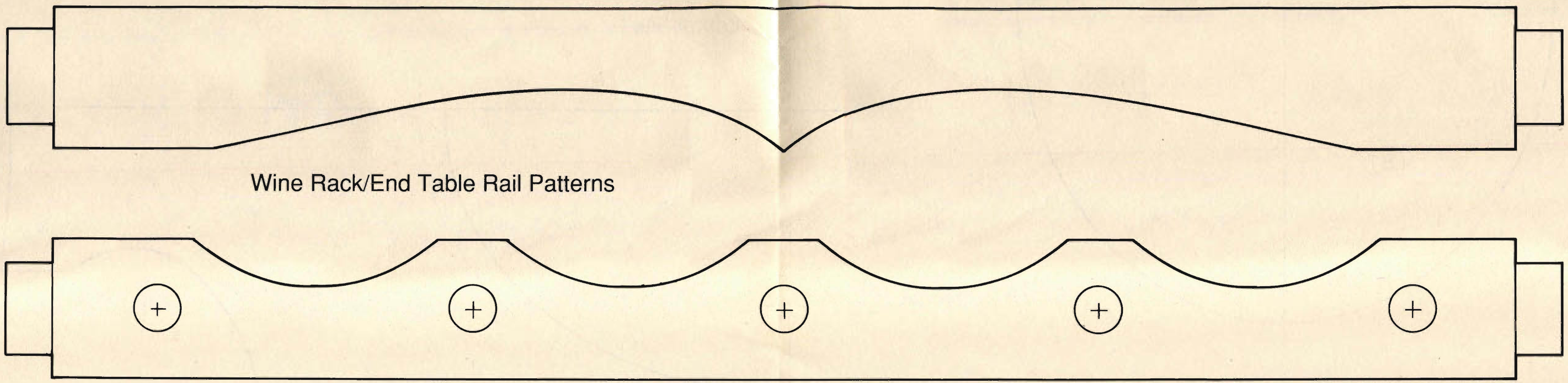
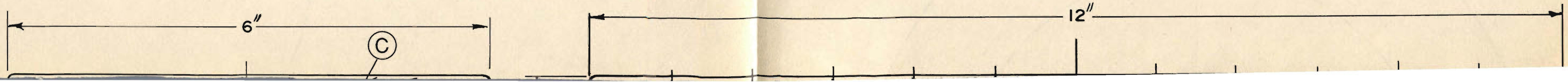


Wine Rack/End Table Rail Patterns

Colonial Footstool Patterns



*A Popular Woodworking Project*

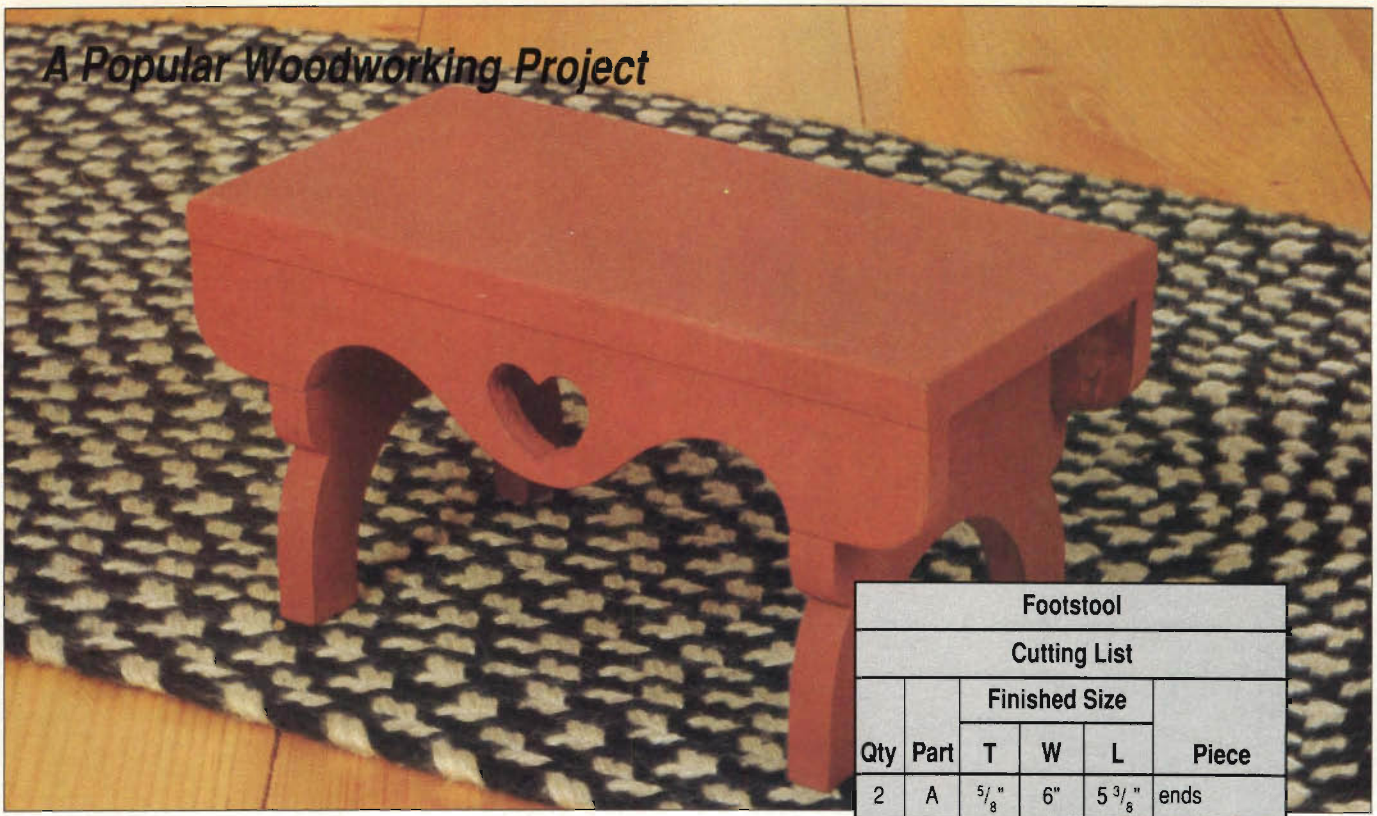


photo by Deborah Porter

# Colonial Footstool

**by John A. Nelson**

In early America, footstools came in just about all shapes and sizes. I doubt if you would ever find two alike, even if made by the same person. In those days the footstool was commonly called a "cricket" because it was usually found at the foot of a chair in front of a warm fire.

This footstool is a reproduction of one made sometime in the eighteenth century in New England. It is easy to make and very sturdy. It can be made of pine or practically any wood, since it will be painted.

Cut out the basic parts to the dimensions in the cutting list. You will find a full–size pattern in the PullOut™ Plans section in the middle of this magazine for the ends (A) and the braces (B). Tack the two rough-cut end pieces together, transfer the end pattern onto one of these, and cut out both at the same time using a band saw, jigsaw, or sabre saw. Do the same with the braces (B), and sand all rough edges.

To assemble, attach the braces to the ends using finish nails and glue. See the exploded view for the correct fit. Next, line up the top (C), and glue and nail it in place.

Sand the assembled stool all over, and ease the sharp edges along the top by sanding. Paint your stool however you like. When it's dry, find a cozy chair and a warm fire to try out your new "antique" cricket. PW

*John A. Nelson is the author of many books on woodworking and a frequent contributor to* Popular Woodworking.

**Footstool**

**Cutting List**

| Qty | Part | Finished Size T | W | L | Piece |
|---|---|---|---|---|---|
| 2 | A | 5/8" | 6" | 5 3/8" | ends |
| 2 | B | 5/8" | 2 1/4" | 12" | braces |
| 1 | C | 5/8" | 6" | 12" | top |

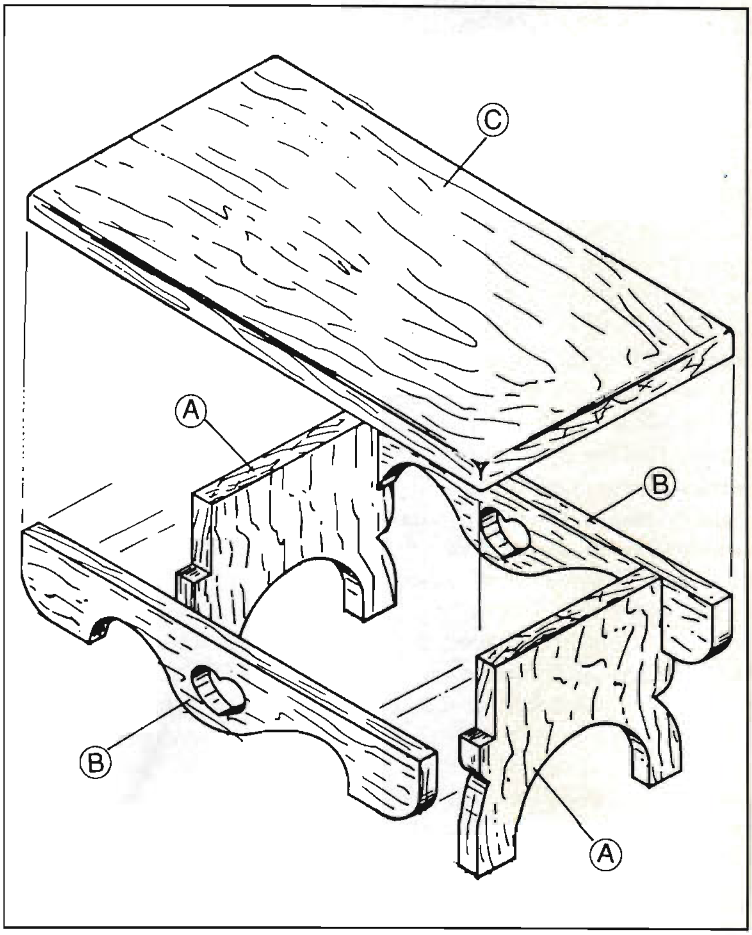
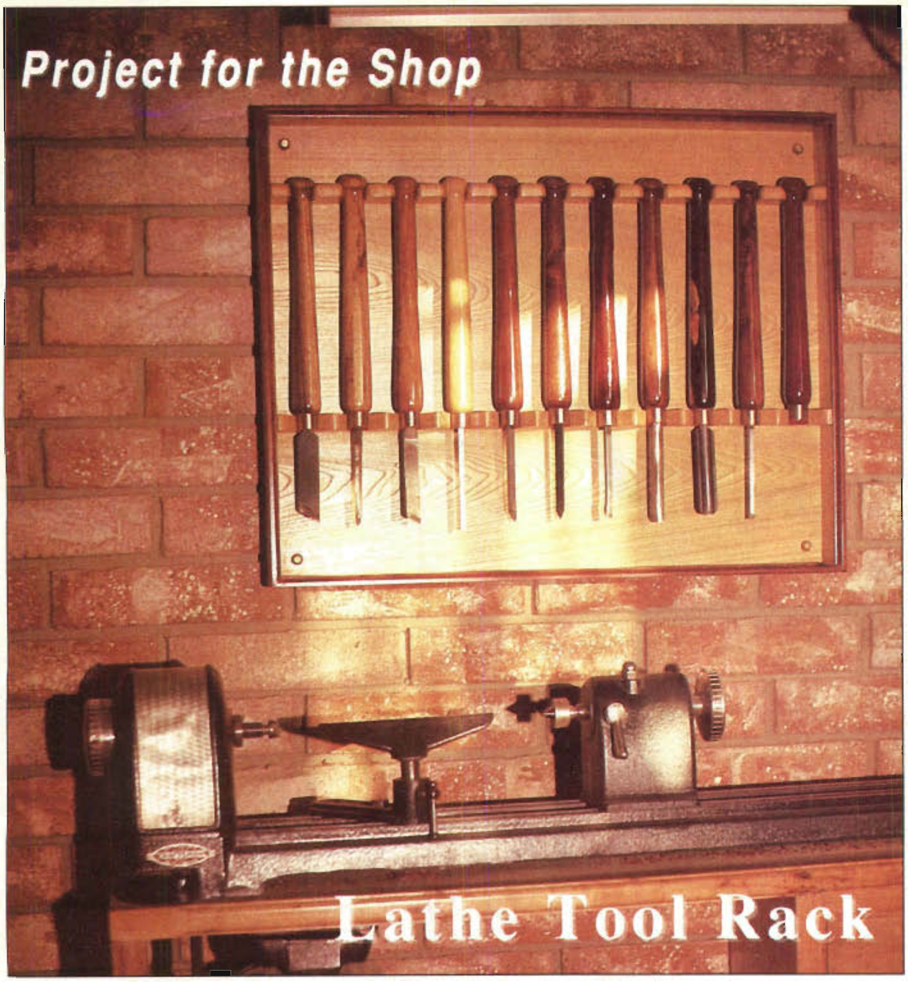


illustration by the author



## Project for the Shop

# Lathe Tool Rack

photo by the author

**by Jerry Ernce**

I hadn't had my wood lathe for too long before I decided that I had to come up with a place to keep the tools. I looked around at what the professionals do, and didn't see anything I liked. They had them blade–end–up in a box hung on the side of the lathe, or just laying on a table or in a drawer. Nothing I saw looked safe, neat or organized. I felt that the tools should hang near the lathe at eye level so I could get to them easily and not have to pick up two or three to find the one I needed. I worked out new handles that had to be lifted to be removed from a rack. This would keep them from falling out accidentally. While I was making new handles, I made them longer for leverage. I turned each handle from a different hardwood for quick identification and beauty. It all fell together to make a safe, neat and handy lathe accessory.

Start by making the handles. Use a different hardwood for each tool—each piece 1-1/2" square × 13" long. If you can, salvage the metal ferrules from your old tools, or you can get new ones. I had a machinist friend make me new ones out of brass. *[Editor's Note: See "Tricks of the Trade" on page 5 for another ferrule idea.]*

Mark and drill the hole in each piece to fit the gouge or chisel you have chosen for it, and drill the hole so that it fits snug. If the shank of your cutter is tapered, you may have to drill stepped holes to get a good fit. Mount the hardwood blank on the lathe, and turn the handle round. Finish turning the handles using the pattern in Figure 1. I worked out this shape because of its function; the business end is thick to carry the stress put on the cutter, the length is for leverage, and the knob acts as a hanger and also lets your fingers know when you've reached the end of the handle. While I was at it, I made an extra handle for any tool I might want to add later on.

You may want to alter the dimensions of the rack if you have more or fewer tools than I do. The dimensions given here are for a rack that will hold 11 tools. With the upper rail (A) cut to size, lay out the holes and slots as shown in Figure 2. Drill the

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*Jerry Ernce is a woodworker in Broken Arrow, Oaklahoma.*

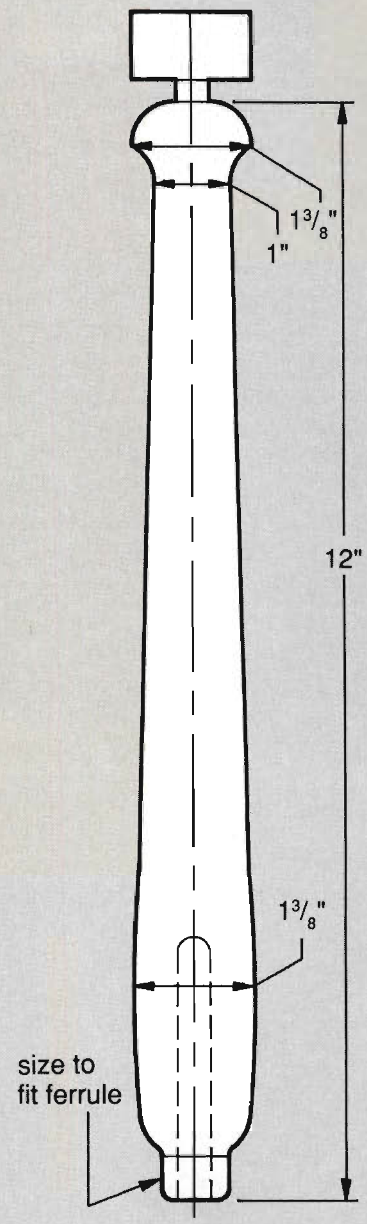


**Figure 1**

| Lathe Tool Rack | | | | | |
|---|---|---|---|---|---|
| Cutting List | | | | | |
| | | Finished Size | | | |
| Qty | Part | T | W | L | Piece |
| 1 | A | 3/4" | 2" | 30 1/2" | upper rail |
| 1 | B | 3/4" | 2" | 30 1/2" | lower rail |
| 2 | C | 3/4" | 2 3/4" | 34" | frame sides |
| 2 | D | 3/4" | 2 3/4" | 24" | frame ends |
| 1 | E | 1/8" | 23 1/4" | 33 1/4" | back |

**Figure 2**

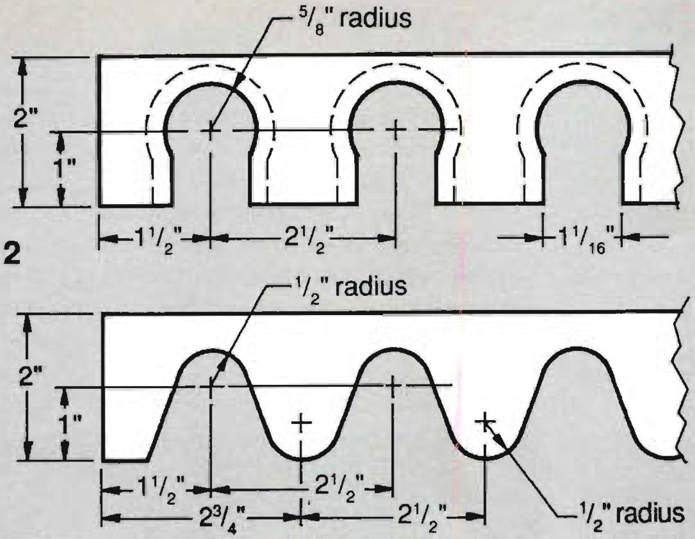
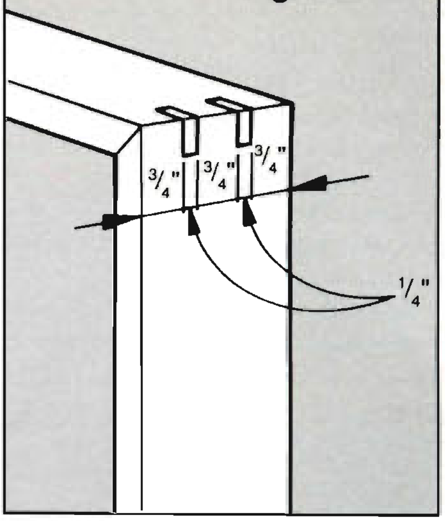


**Figure 3**



holes first, using a 1" bit. Then rout the edge of the rail, using a 1/2" round–over bit. Next, cut the slots through from the front to the holes, and then rout the edges of the holes and the slot, and the front edge of the rail. Make the lower rail (B) next, drilling holes first and then cutting out the slots with a band saw or coping saw, and then sanding smooth. Don't rout this rail.

Make the box by first cutting out the four pieces for the sides (C) and ends (D). Miter the ends of these pieces as you cut them to length. Cut the 1/8" wide X 3/8" deep groove in the back (E) in each piece.

Assemble the box with its back in place and glue and clamp the mitered corners together. Square up all four sides. When these are dry, cut the slots for the splines. The "Jig Journal" at left contains instructions for a jig which will make these cuts easily. You can make your splines out of any thin stock, such as 1/4" hardwood or plywood. Choosing a wood that contrasts with your frame will make a nice looking joint.

Make the splines oversize, and glue them in place. After they're dry, sand the splines flush. Attach the rails in place using glue and drywall screws countersunk from the back. If your tools are of different length be sure that you place your rails so as to leave room for the cutters at the bottom and room at the top to lift the tools for removal. Finish the rack with the finish of your choice (I used a polyurethane) and mount it on the wall near your lathe.

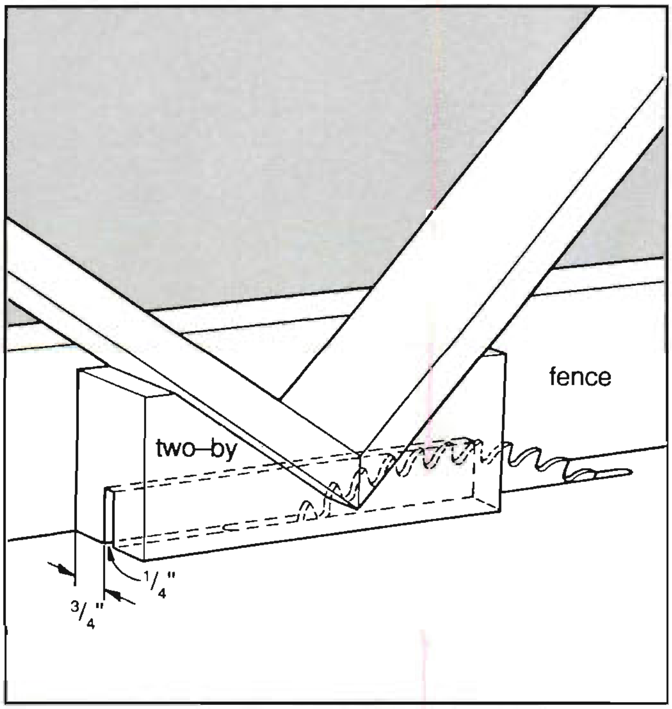
Now, pick a tool...any tool. You should never have to fumble in the shavings again. PW

*Jig Journal*

## Corner Notching Jig

This simple jig will let you cut exposed spline joints in a mitered frame using a 1/4" dado blade on a table saw. Make the jig from stock that's thick enough to properly support the frame (I used two–by material for this 2" frame) and wide enough to accommodate the cut. Attach a high auxiliary fence against which you can reference the jig and the frame.

Glue up the frame and place it in the jig to set the blade height. Set the fence 3/4" away from the blade and cut through the jig. With the frame in the jig, cut a slot in each corner referencing the same edge against the fence. Make a second cut in each corner by referencing the opposite edge against the fence.



illustrations by Tom Larson

# Swedish Savers

### by Shirley Stebbins

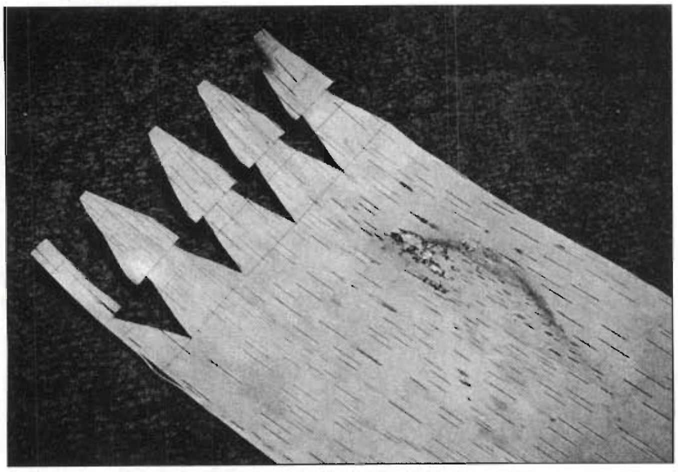
Peter Tryg's work as a lumberjack in the North woods of Minnesota led him quite naturally to a love of wood carving, and many of his carvings are of lumberjacks. It was his Swedish heritage, however, that led him into making these authentic birch bark canisters. He learned how while on a visit to his ancestral homeland.

Before he begins making these Swedish "savers," Peter cuts a complete pattern out of paper or lightweight cardboard. He has come up with several different versions of the interlocking splice that joins the ends of the bark, the most common being arrow-shaped fingers that lock into triangular cutouts. The PullOut™ Plans section in the middle of this issue has a sample pattern; this is folk art, though, so variations are encouraged.

Removing the birch bark from the tree is a simple matter of making a vertical slit with a knife and peeling the bark off. This must be done in June, while the sap is still running.

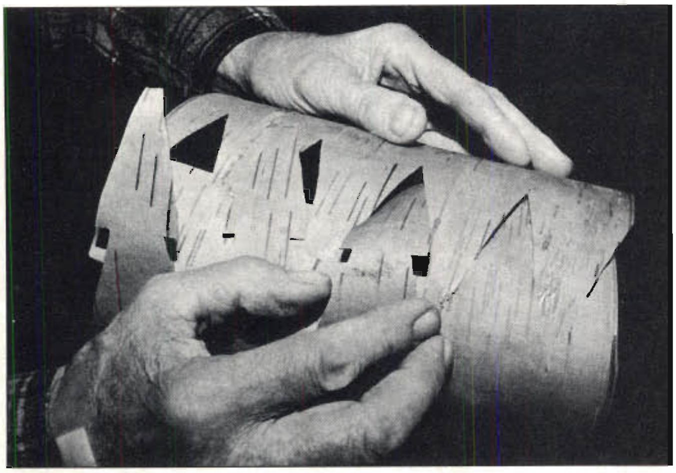
Peter traces his pattern onto a long sheet of birch bark and cuts it out with a straight knife and a chisel. If he wants to make

***Shirley Stebbins** is a writer from Sturgeon Lake, Minnesota.*



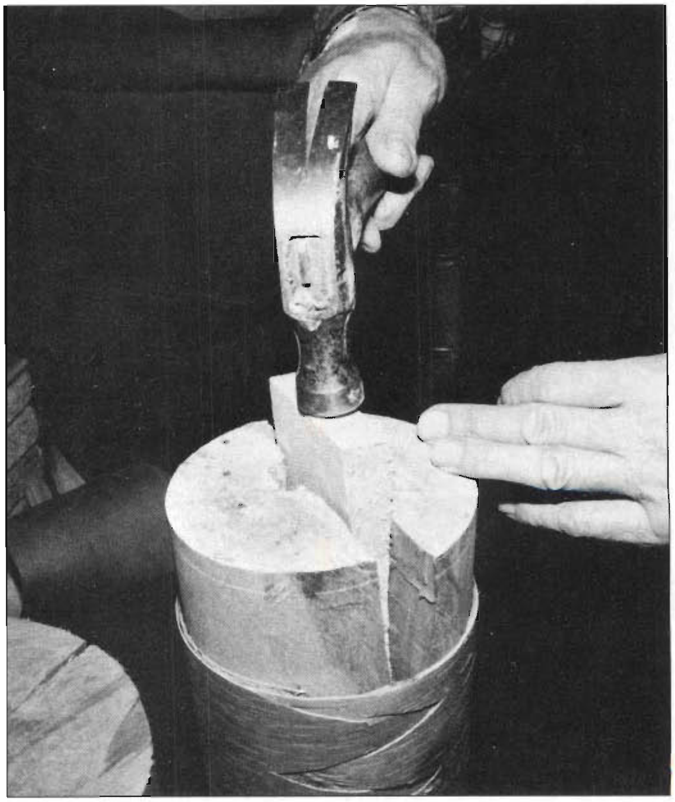
***Peter cuts arrow-shaped fingers, or some other inter-locking joint on one end.***

***On the other end of the piece, he cuts the shape that will receive the fingers.***



***He puts the glued bark onto a tree core that has been split in half, then he drives wedges tightly into each end and lets it dry.***

***Peter carefully locks the two ends together and spreads a coating of wood glue inside the overlapping ends.***



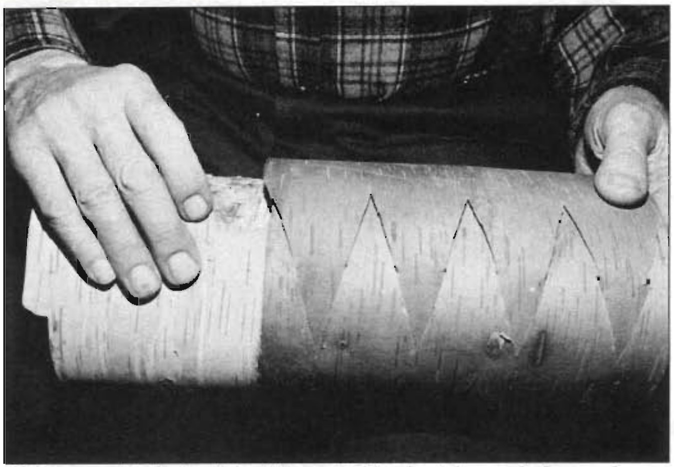
the edges more decorative, he cuts them with pinking shears, as on the smaller cannisters and the oval snuff box in the photo at bottom.

Next he splits a length of tree core that will fit into the canister and ties the two halves back together. He then wraps the bark around the core and glues it at the notches with carpenters wood glue. To make sure that the canister dries tight and circular, he drives a wooden wedge into the slit of the tree core at each end. He allows this part of the canister to dry for at least six hours.

When the canister has dried, Peter glues another layer of birch bark into the inside of the canister, drives the wedges back into the core, and allows it to dry once again.

Peter then cuts a top and bottom for the canister out of pine and attaches a leather handle to the top. He glues the bottom in with wood glue. Sometimes he finishes the outsides with paint or varnish, but usually leaves them unfinished.

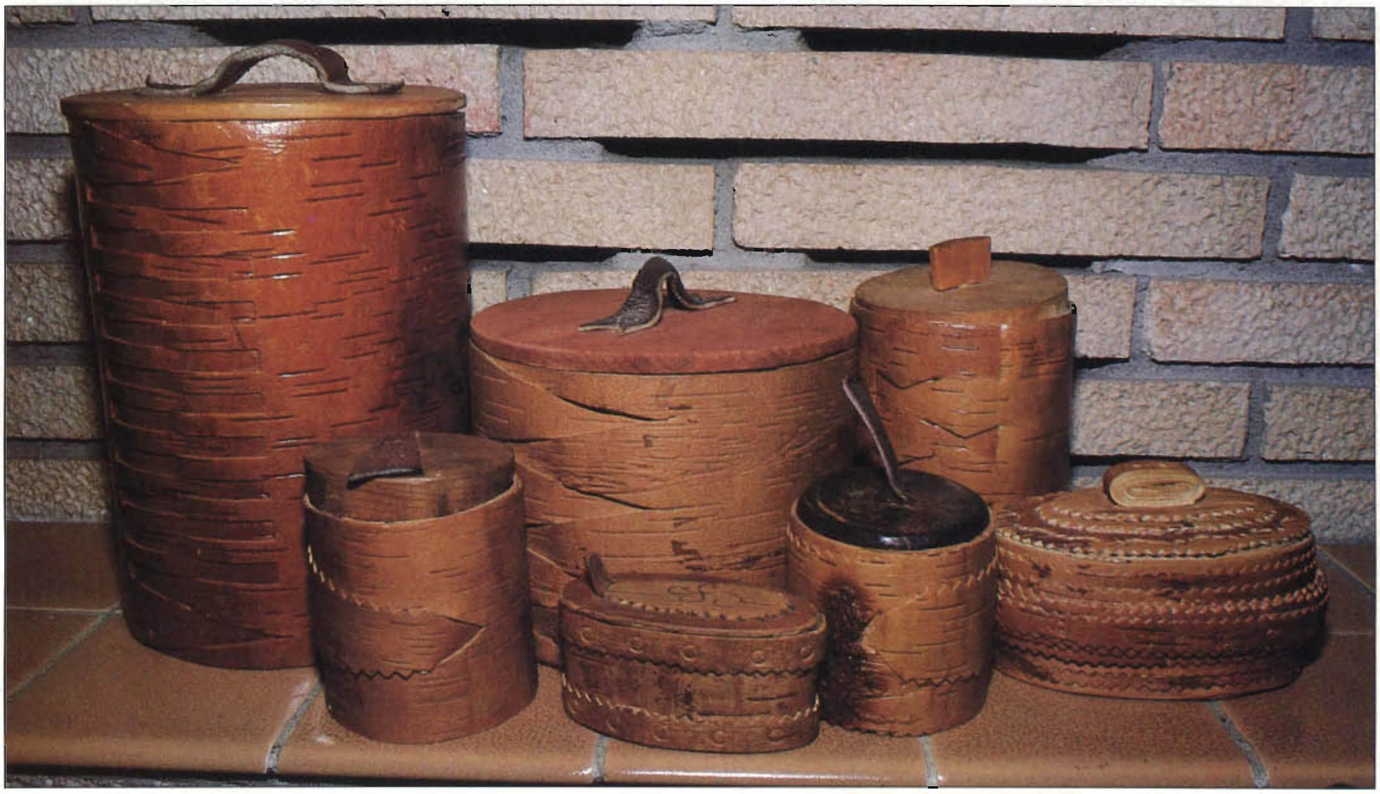
These Swedish savers are not only decorative, but can also be used as the Swedes used them—for flour, sugar lumps, and even snuff! PW



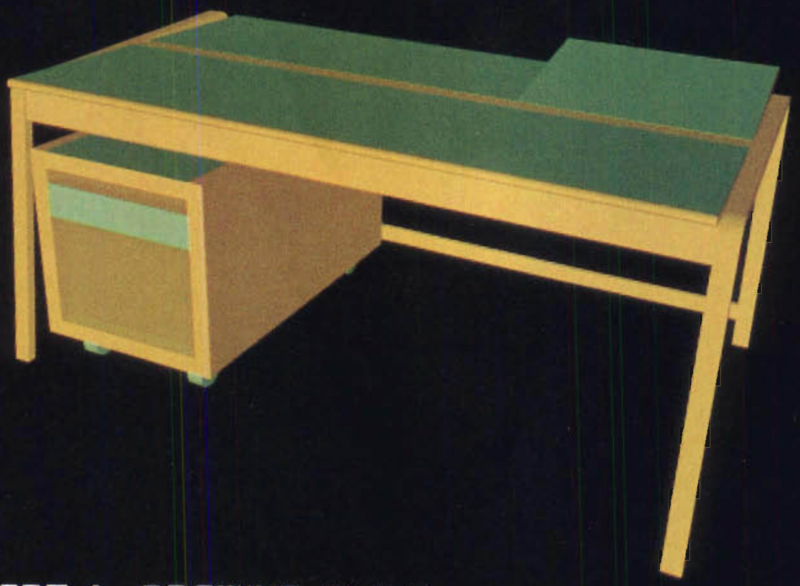
***Peter spreads the inside of the outer bark with wood glue and pushes in a birch bark lining for the canister. He then repeats the procedure with the tree core, driving in the wedges and allowing it to dry.***

***A pine bottom and a lid with a leather handle complete the canister.***

***This method can be used to make a large variety of sizes and styles . The smaller Swedish savers were trimmed with pinking shears.***



# COMPUTER-ASSISTED FURNITURE DESIGN



## PART 1: DRAWING IN 3-D

*This computer desk was designed by Scanco using Dimensions Presenter software.*

**by Alan Marks**

Deep in the recesses of my mind, I have always nursed the hope that one day I will put away my mechanical pencils, eraser, drafting board, rolls of paper and all the other countless paraphernalia I assemble periodically in order to draw a simple piece of furniture. Someday, I have told myself, it will be possible to sit down at a computer and do it all on the screen.

Furthermore, I fantasize about never having to build another prototype. Imagine being able to draw a three–dimensional scale model of a chair (the most complex piece of furniture, to my mind) on the computer screen, and turn it around and view it from every conceivable angle.

Could this really be too much to ask for? I think not. The Macintosh combined with my favorite word processing program has already helped me achieve one dream, which was to never have to re–type a manuscript.

With this in mind, and after amassing a collection of the latest drawing and design software available for evaluation, it gives me great pleasure to share my findings on computer–assisted drawing, which I hope will encourage the reader as much as it has me to give computer drawing with the Macintosh a try.

Why the Macintosh? The Mac, as users lovingly refer to it, is easy to use, fun to learn about, and graphically oriented—much more so than its competitor IBM and its clones. The way in which the Mac and its user communicate relies on a visual interaction, as opposed to the verbal/numerical system used by other computers. The Mac operates largely through the use of a "mouse," a small device which you slide across your desk top, which in turn moves a pointer on the computer screen. Files and documents on the Mac appear as tiny picture representations called "icons." To open a file, you position the pointer on it and click a button on the mouse. All operations on the Mac are carried out using this same basic method. Variations, such as clicking twice on the mouse, or "dragging" by holding the button down while you move the mouse, allow you to perform different functions.

Although this ease of operation is a good reason to recommend the Macintosh, more important is its graphics capability. While the IBM and IBM–based systems concentrated on business and financial–oriented programming, the Macintosh developed as the leader in graphics, and is used widely by designers and graphic artists. This is due, in part, to the Mac's visual orientation, and partly to the fact that because of this, there are more

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*Alan Marks is a cabinetmaker in Carmel Valley, CA, and a contributing editor to* PW.

and better programs available for the Mac. If you're already an IBM or IBM–type owner and find yourself drawn to computer drawing, don't despair—there are programs available in IBM versions as well.

The two parts of this article correspond to the two major work areas addressed by programs: two–dimensional space and three–dimensional space. In this issue, I will discuss software as it pertains to three–dimensional drawing; two –dimensional drawing will be discussed in the next issue (August/September 1989). To qualify as three–dimensional, a program had to be capable of creating facsimiles of objects which can be rotated and viewed from any angle in three–dimensional space. As far as my experience goes, no program can claim to be equally proficient in both areas. An illustration of Macintosh graphics may be found on page 78 of this magazine. William McMaster regularly uses the Macintosh together with a graphics program called Adobe *Illustrator 88* to produce drawings for his carving articles. Illustrator Tom Larson, whose drawings regularly appear in *PW*, uses a popular program called AutoCad, which has recently become available for the Macintosh.

Figure 1

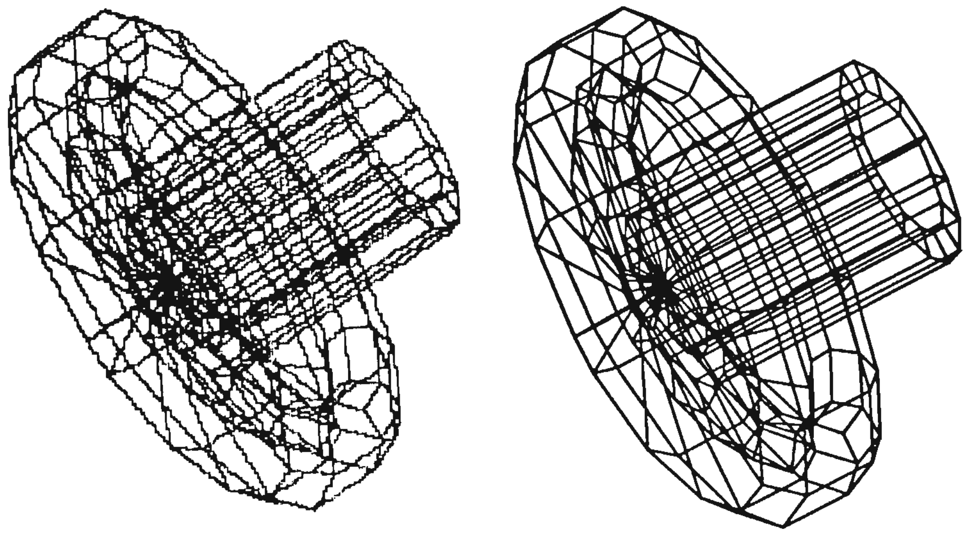


illustration by the author

*The MiniCad+™ version of the knob, shown in dot-matrix and laser printer versions.*

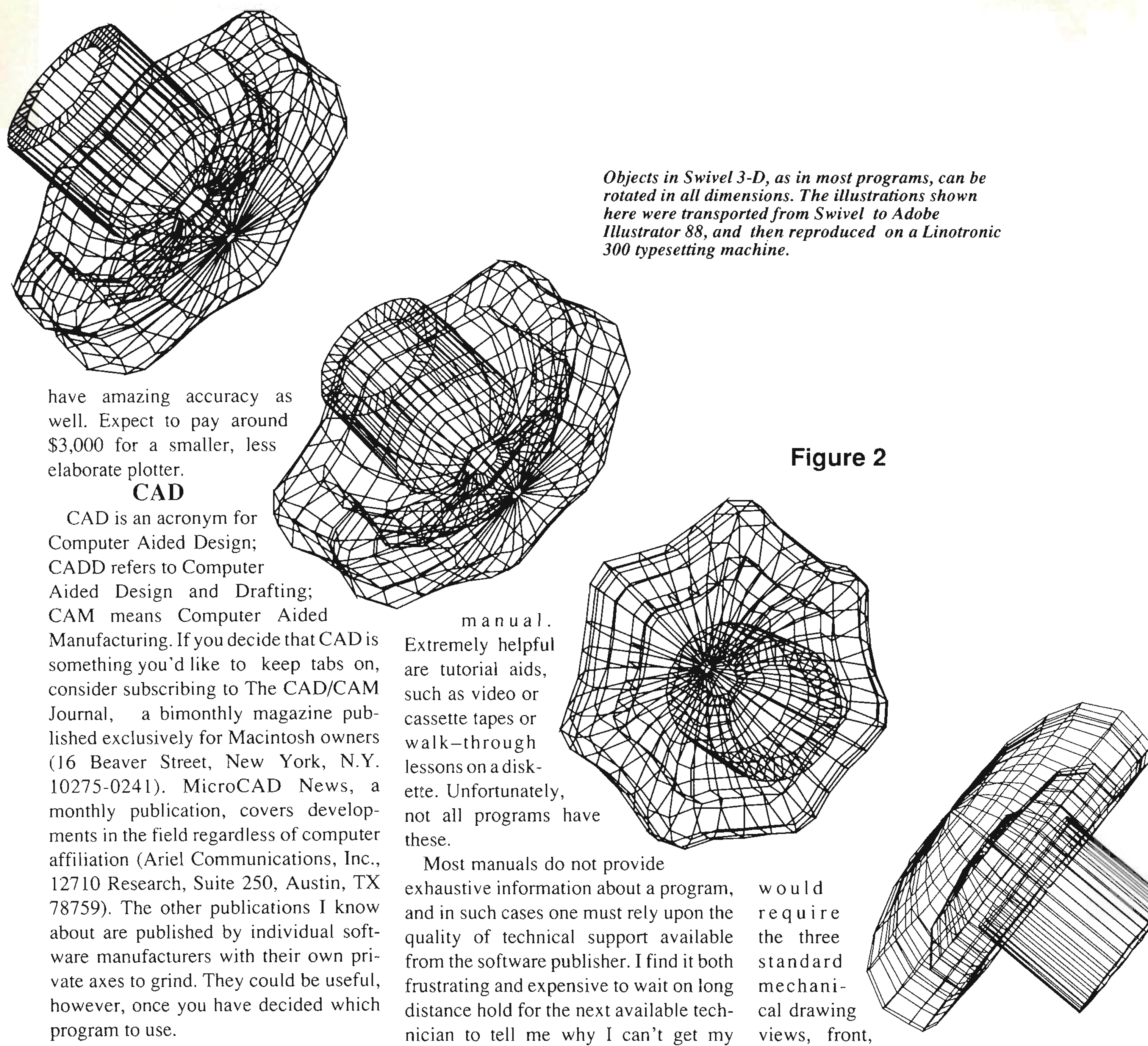
## The Macintosh

Besides needing one of the programs discussed in this article, what kind of equipment do you need to produce drawings? The Macintosh Plus, currently Apple Computer's entry level model, will run any of the programs mentioned in this article. The Macintosh Plus sells for around $1,350 but if you get a package deal, it can be purchased cheaper. My particular Plus has two–and–a–half times the memory Apple originally supplied it with. Drawing programs can require a lot of memory in proportion to the complexity of your drawings. A few 3-D design programs exist which only the more advanced Macintosh II can operate, but these were not considered for this review. Besides the computer, which comes equipped with keyboard, monitor, and mouse, you will need a storage device called a hard disk. Depending upon how much information you wish to store in your hard disk, you can expect to pay upwards of five hundred dollars for one.

## About Printers

To print out a copy of your drawings, you need a printer. These come in a number of types, two of which are applicable here: **dot-matrix** and **laser** printers. The dot-matrix type is the basic computer printer, using a "grid" (matrix) of dots to assemble words or drawings. These printers are very affordable, ranging from one to a few hundred dollars depending on the features included. Laser printers are a more recent invention. Figure 1 shows a dot-matrix printout next to that of a laser printer. As you can see, the clarity, smoothness and definition of laser printers is vastly superior to dot-matrix types. For most of us, the cost of a laser printer will be prohibitive, and the dot-matrix printer will be the most logical choice. However, many copy shops and print shops now have a laser printer service, where for a price (usually under a dollar a page) they will print out your drawing from a **diskette,** a small portable storage device which costs about two dollars. Services in major cites also, for a reasonable fee, will laser print by mail drawings of any standard size or larger. (You can do drawings of practically any size on the Macintosh and are not at all restricted by the relatively small size of the monitor.)

These are humble beginnings. Things can get much more expensive if you pull the stops out. For example, if you decide you want to create drawings larger than an 8-1/2" X 11" format, you may want to consider getting another instrument used by printing services, the plotter. Plotters can produce copies up to 44" wide in some models and 100 feet long. If you get a more advanced computer than the Macintosh Plus, you might consider using color and a color plotter. Major manufacturers of plotters are Hewlett Packard, Cal-Comp, and Houston Instruments. Two types of plotters exist: pen plotters and electrostatic ones. The latter is extremely fast and accurate, though pen plotters



*Objects in Swivel 3-D, as in most programs, can be rotated in all dimensions. The illustrations shown here were transported from Swivel to Adobe Illustrator 88, and then reproduced on a Linotronic 300 typesetting machine.*

**Figure 2**

have amazing accuracy as well. Expect to pay around $3,000 for a smaller, less elaborate plotter.

## CAD

CAD is an acronym for Computer Aided Design; CADD refers to Computer Aided Design and Drafting; CAM means Computer Aided Manufacturing. If you decide that CAD is something you'd like to keep tabs on, consider subscribing to The CAD/CAM Journal, a bimonthly magazine published exclusively for Macintosh owners (16 Beaver Street, New York, N.Y. 10275-0241). MicroCAD News, a monthly publication, covers developments in the field regardless of computer affiliation (Ariel Communications, Inc., 12710 Research, Suite 250, Austin, TX 78759). The other publications I know about are published by individual software manufacturers with their own private axes to grind. They could be useful, however, once you have decided which program to use.

All drawing programs perform operations using "tools." Tools are symbolic buttons on the screen, each of which creates or alters a selected object in some way. The button is accessed by maneuvering the cursor onto it with the mouse and then clicking the mouse. Certain operations are more easily or quickly implemented with some programs than others. Some programs do not perform some operations.

Essential for learning how to use a program is the documentation or instructional material accompanying it. Much depends upon easily understood explanations and on whether answers to questions that pop up can be easily found in the manual. Extremely helpful are tutorial aids, such as video or cassette tapes or walk–through lessons on a diskette. Unfortunately, not all programs have these.

Most manuals do not provide exhaustive information about a program, and in such cases one must rely upon the quality of technical support available from the software publisher. I find it both frustrating and expensive to wait on long distance hold for the next available technician to tell me why I can't get my program to do what it's supposed to. Some users subscribe to electronic bulletin boards accessed over telephone lines via modems. Most major software publishers intercept questions posted on them and provide answers to users, who also benefit from the gracious help of other users on the board. A distinct minority of publishers provide registered users with a toll-free number for assistance.

## Drawing in 3-D

Before looking at the various programs, let me discuss 3-D programs in generic terms. Ideally, to my mind, it should be possible to feed in the basic two–dimensional information required to describe an object adequately. This would require the three standard mechanical drawing views, front, side and top, from which a three–dimensional object would be generated automatically. Accomplishing this is easy if you are creating a two–dimensional representation of a 3–D object. Draftsmen do it routinely using one or more projection techniques. The program of my wildest dreams would create objects with irregular convex and concave surfaces or with irregular voids or holes in them, and require minimal effort to accomplish the task.

The following programs are capable of rotating objects (with some individual limitations to be discussed): Swivel 3-D, Mac3-D, Super 3-D, MiniCad, Pegasys, Mac Architrion and Dimensions. The last four listed also create two-dimensional construction drawings, and their relative strengths and weaknesses in two dimensions will be discussed in the second part of my article.

Some of the above programs create three-dimensional extrusions of two-dimensional shapes. Some rotate a two–dimensional shape about a central axis, creating something similar to a lathe-turned object. Several are capable of modeling solids but cannot easily handle voids.

Bearing my fantasy program in mind, let's see how closely each of these programs approaches this ideal.

**SWIVEL 3-D** Paracomp, Inc., 123 Townsend Street, Suite 310, San Francisco, CA 94107, (415) 543-3848

Swivel 3-D is a truly unique program among its fellows. I can see Swivel as the ideal tool for a designer of children's toys. With Swivel, a number of solid parts, arms, levers, or whatever, may be linked to one another at joint intersections and moved through predetermined arcs or rotated in relation to one another. As a test of these programs I chose to draw one of the knobs from my band saw. I chose it for practical reasons; I needed to send a drawing of it to the manufacturer to assist him in replacing a knob that was lost. The closest I could come to producing the object with Swivel is shown in Figure 2. I couldn't figure out a way of producing a seven-sided polygon as a starting point. Six or eight was the all the program would allow, so I chose six. After choosing a hexagonal cross section, I "crossed" that shape using something called a free poly tool with a symmetrical through-section at 90° to its axis. The free poly tool produces most dramatic results. The best thing about Swivel is that when you change something in the cross section, top or side views, you see immediate results in the three–dimensional one, and vice-versa.

To use Swivel you have to conceive of a complicated object in terms of simple shapes and forms. Once created, these can be assembled to make almost anything. And whatever you make can be viewed in perspective from any conceivable angle. After creating my hexagonal solid, I created a cylinder with a hole in it and linked the two objects on the same axis with the linking tool.

I enjoyed working with Swivel, even though it was impossible to scale my lines. Since there is no provision for sizing them in the program, I had to guesstimate proportions. Also I could find no way to reproduce the knob's complicated curvatures.

Documentation included a tutorial and sample files on disk. I found the program fun to learn and extremely versatile. Dimensioning is impossible and text is not an option, although the results can be copied into other drawing programs with text provisions, mentioned above, and text can be added.

**MAC3-D** Challenger Corporation, 18350 Kedzie Avenue, Homewood, Illinois 60430, (312) 957-3475

Mac3-D is one of the original, if not *the* original, three-dimensional programs for the Macintosh. It operates in the conventional mode pioneered by Apple Computer in its first drawing program for the Mac—MacDraw. In Mac3-D, when objects are selected, they are highlighted with re–sizing handles. Clicked on and dragged with the mouse, selected objects are changed in size or shape, or both. In Mac3-D, entire three-dimensional surfaces can be moved. Prismatic shapes can be altered by changing the position of a vertex, or single edges may be moved parallel to their original position.

As with Swivel 3-D, closed objects may be shaded, but they may also be filled with patterns and textures. Two–dimensional drawing can be done, but the makeup of this program doesn't encourage it. The shading process in Mac3-D is woefully primitive and slow. I found Mac3-D cumbersome to use and cannot recommend it .

**SUPER 3-D**™ Silicon Beach Software, Inc., P.O. Box 261430, San Diego, CA 92126, (619) 695-6956

This is a very well–thought-out program, and its excellent features really impressed me. For example, rotation bars are built into the sides of the drawing surface and operate when you drag on them. When they turn they spin like thumbwheels. Really ingenious! Like Swivel 3-D, it shows solid objects in perspective.

Four views are supported simultaneously, and as you change the top, side, or front view, changes in the three-dimensional view occur at the same time. At your option you may fill the screen with any one of the views. It does both extrusions and revolved profiles about a chosen axis to create solid, lathe-turned objects. There are no provisions for creating regular polygons in the tool palette, so I could not create a top view of the knob with its seven scalloped sides. In this program, it is possible to scale objects in generic units, a real plus when getting things drawn in correct proportion is critical. A window, when called upon, will temporarily display the dimensions in generic units of any object you select. Unfortunately, you cannot assign permanent dimensions to the drawing itself. You can enter text, choosing from a number of styles and sizes.

There is an excellent tutorial in the Super 3-D manual. The manual is good, except that there were so many errors in it when originally published that they sent an extensive errata sheet along with it. It took me about twenty minutes to copy these corrections into the manual. The index isn't worth much so I had to hunt around a lot to find answers.

Overall, this is a great program, with a few rough edges.

**MINICAD+**™ Graphsoft, Inc., 8370 Court Ave., Suite 202, Ellicott City, MD 21043 (301) 461-9488

MiniCad+ is the first of four ensuing dedicated drafting programs which incorporate three-dimensional capabilities on the side. The MiniCad+ 3-D manual is well done and extremely clear. There is no tutorial; you make experiences entirely on your own, but chances of success run high because the various tool and menu options are so well explained. Explanations are easy to locate in the manual.

I liked the way 3-D was implemented in MiniCad+. It relies heavily upon tools and commands in the 2–D module and integrates smoothly with them. But, unfortunately, it does not attain a high level of sophistication.

You cannot create concurrent axonometric views. I was able to create a knob-like object by rotating a profile, but could not link up discrete components to build my knob. Since chairs are built up of discrete parts, there is no way to my knowledge that MiniCad+ could create one in 3-D. And there seems to be no reason to prefer MiniCad+ for designing cabinets in 3-D either. In fact, if one were to choose a program for 3-D capabilities alone, there would be no reason to pick MiniCad+.

**PEGASYS EXPERT**™ IGC Technology Corporation, 305 Lennon Lane, Walnut Creek, CA 94598, (415) 945-7300

Pegasys does have tutorials, and one of them is called *Working in 3-D*. Pegasys supports one type of three-dimensional representation, called a "wire frame." Wire frames are lines drawn on invisible planes or surfaces and they outline an object. Because the planes are merely delineated with lines, and not solid, you can see through the lines to other planes behind them. The other 3-D programs mentioned above all support solid, shaded surfaces as well as wire frame ones and do not have this restriction. This does not necessarily condemn Pegasys to a low rank on the totem pole, however. Pegasys is a sophisticated drafting program that offers a 3-D option on the side.

Pegasys does not allow you to combine objects in 3-D, nor can they be edited extensively once they are drawn. I was able to create a seven–sided polygon, properly scaled and dimensioned in millimeters, my unit of choice in the drafting mode. Working with this basic shape I created one scalloped side, which the program allowed me to rotate and duplicate (a great feature) seven times about the center of the polygon. I then deleted the polygon and filleted the arcs internally. I could extrude this two–dimensional shape so that it had an exact thickness of sixteen millimeters. I could rotate it and view it from all angles.

I could also create a cylinder with a hole in it, representing the shaft of the knob. But that was the most I could do with it. I couldn't link the two objects on the same exact axis, and I couldn't reproduce the complex curves of the knob.

Pegasys did not allow me to view changes in three planes simultaneously, nor could I easily or quickly switch from one view to the next. I could not see how the program could be used for creating and linking complex three–dimensional objects, though you might want to use it for drawing cabinets in wire frame, or architectural drawings in which you'd like to peek into a room with extruded wire frame walls and furniture from all angles.

**PLANIT**™ Microspot, 21060 Homestead Rd., Suite 207, Cupertino, CA 95014, (408) 739–0326

And speaking of cabinets, we come to Planit. Planit is marketed as a computer-aided kitchen design program. With it, you can lay out predrawn cabinets, appliances, floors, ceilings, and do entire kitchens in perspective viewed from any angle. The hitch here is the word "predrawn." The software manufacturer licenses the system to various cabinet manufacturers and equips your version with catalogs of whatever lines of cabinets exist as options. The demo I evaluated, however, was impressive.

Now why can't you create your own cabinets, you ask? Though not available for me to evaluate, part of the Planit package includes a Catalog Editor, which will enable you to do just that.

**MAC ARCHITRION**™ Gimeor, Inc., 1815 H Street, N.W. Washington, D.C. 20006, (202) 223-4373

Also in the architectural vein, Mac Architrion, developed in France for the Mac, is a top of the line program whose two-dimensional capabilities will be discussed at length in Part 2 of this article. Of the programs containing both 2-D and 3-D modules, Mac Architrion is the only one which places greater emphasis on 3-D. Purely an architectural application, it makes no claims to be a universal tool. It seemed logical to its developers that two-dimensional plans should be developed from 3-D ones since architects tend to visualize in three dimensions.

Furniture has an architectural form, but unfortunately, furniture with curves cannot be rendered adequately with this program. It is incapable of building complex forms, using only primitive solids as it does. There are no automatic shading features, though surfaces may be individually textured to simulate shading. Creating cabinetry is a distinct possibility, however, as long as the elements can be composed out of blocks. The procedures for rotating objects, defining horizon lines, types of projection, and viewpoints were impressive but they could not be quickly or easily implemented. Making a shape anything like my knob was impossible.

**DIMENSIONS PRESENTER**™ Visual Information, Inc., 16309 Doublegrove, La Puente, CA 91744, (818) 918-8834

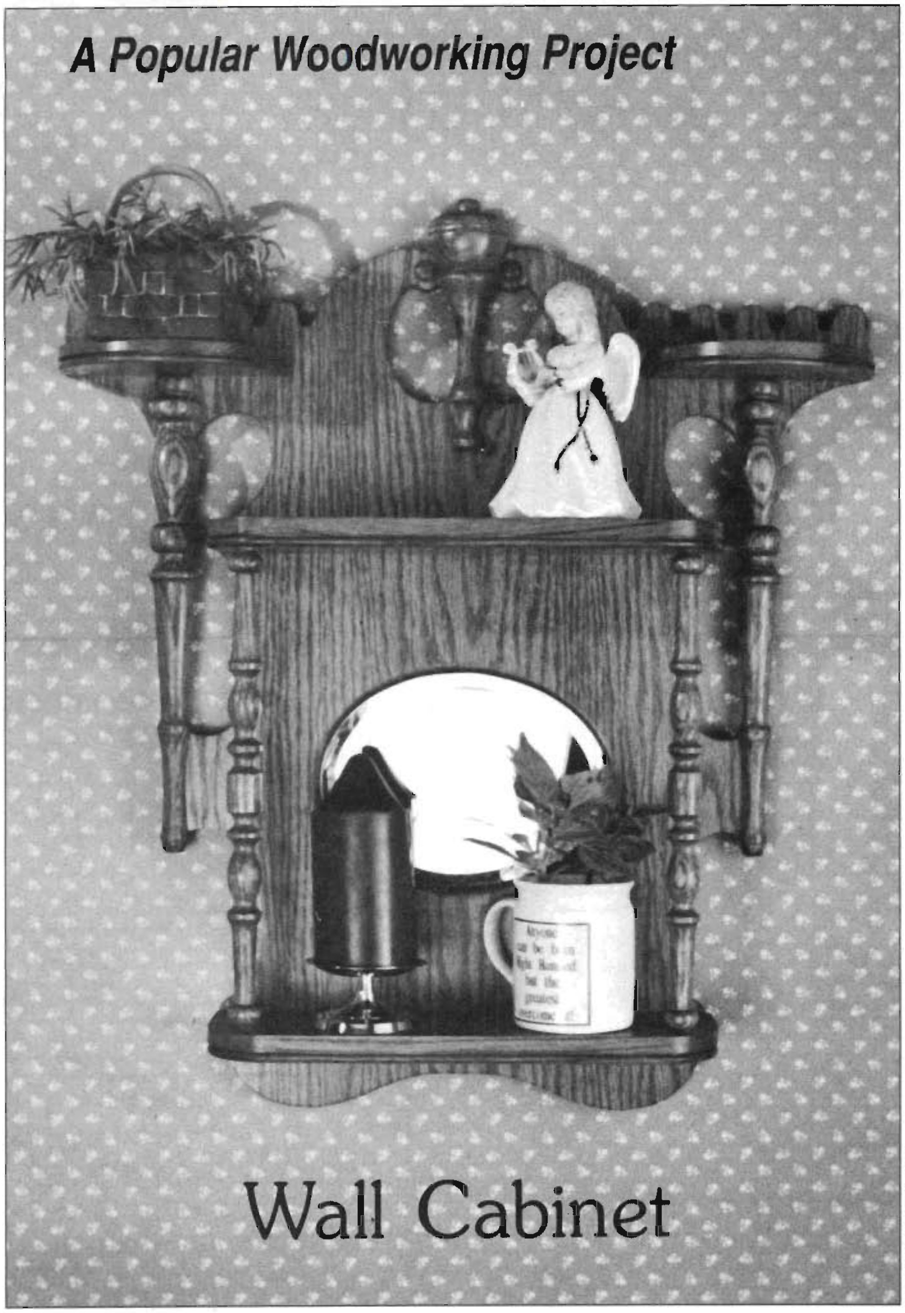
Of all the programs I tried. Dimensions Presenter had the most potential, it seemed to me. Still in preparation by the publisher at the time this was written, the manual in pre–release form promised nirvana. At first glance, Dimensions Presenter looked as though it would allow me to import into it, for three-dimensional viewing, drawings originally created in two dimensions using any one of a number of common 2-D drawing programs for the Mac, including MacDraw, Dreams, and MacDraft. Great, I thought. Anything I've drawn in them, I can recreate in 3-D with Presenter. Not so, Joe.

Presenter will, when its bugs are exterminated, permit us to import a specially created drawing in plan view, one utilizing grouping and layers labeled with special text markers. The object created in 3-D will either consist of extruded shapes or be a lathe–turned profile. Neither of these can be edited further. That's the bad part.

The good part is that you will be able to compose rectangular cabinets using it with your favorite drawing program, or a piece or pieces of furniture with rectangular or circular components and then shade them and view them in perspective from any angle and with any lighting you choose. In this respect, it does Mac Architrion one better.

Now, though I still haven't unearthed the 3-D program that fulfills all of my dreams, I don't intend to end this article on a defeatist note. There is hope for us. First of all, in the next installment of this two-part article, I plan to tell you about some exciting two-dimensional programs I've looked through which I guarantee will draw anything in two dimensions that your heart desires.

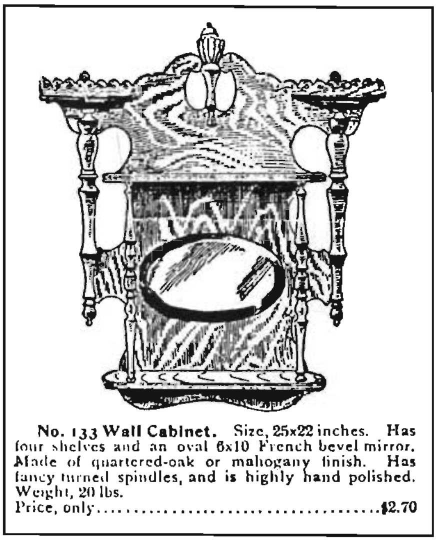
Secondly, as concerns the 3-D dilemma, one of the above-mentioned software publishers promises to show me a 3-D program that runs on the Mac Plus and creates and manipulates complex objects of any shape. Another speaks of a soon-to-be-announced 3-D interior design program for the Mac which lets you create and manipulate your own furniture. If this rosy future materializes (or should I say, takes shape?), I promise you'll be the first to know. PW



## A Popular Woodworking Project

# Wall Cabinet

photo by David Camp



**No. 133 Wall Cabinet.** Size, 25x22 inches. Has four shelves and an oval 6x10 French bevel mirror. Made of quartered-oak or mahogany finish. Has fancy turned spindles, and is highly hand polished. Weight, 20 lbs.
Price, only....................................$2.70

### by Devore O. Burch

My friend Bill McGee is an antique dealer. One day in his shop, he showed me an old furniture catalog published around the turn of the century. Bill mentioned how scarce some of these items were becoming and how much they were in demand by his customers. He thought that replicas of some of the pieces in the old catalog would sell very well in his shop, and asked if I would care to make them.

This "wall cabinet" is one of the items we selected from the old catalog. Though I'd be more inclined to call it a shelf, according to the catalog, it's a cabinet. This is from the "Age of Golden Oak," a period that started before 1890 and began to fade away after 1920, during which time most furniture manufactured in America was made of oak. General dimensions were given in the catalog description of the item, so I scaled the drawing up to these dimensions and made a batch of 12. This wall cabinet was offered in either golden oak or walnut finish, and it sold for $2.70 retail in 1900 with a bevel–edged mirror; I got $175.00 apiece wholesale for my reproductions, but Bill never told me his retail asking price.

## The Back Panel and Shelves

A full–size pattern for the back panel (A) is in the PullOut™ Plans section in the center of the magazine. Tape the two pages of the plans together at their edges where shown by the shaded area, and trace the pattern onto some butcher paper or drafting velum. Make the back panel by gluing up 3/4" stock to the rough width and length given in the cutting list. Scrape the surfaces, and choose which will be the front, then draw the pattern on the back. Since the panel is symmetrical about the vertical center line, the PullOut™ Plan is for one half of the panel. Mark the vertical center line on the panel, line up the pattern with the center line, and mark the outline on the panel. Flip the pattern to the other side of the center line to mark the rest of the panel outline. In addition to the mirror

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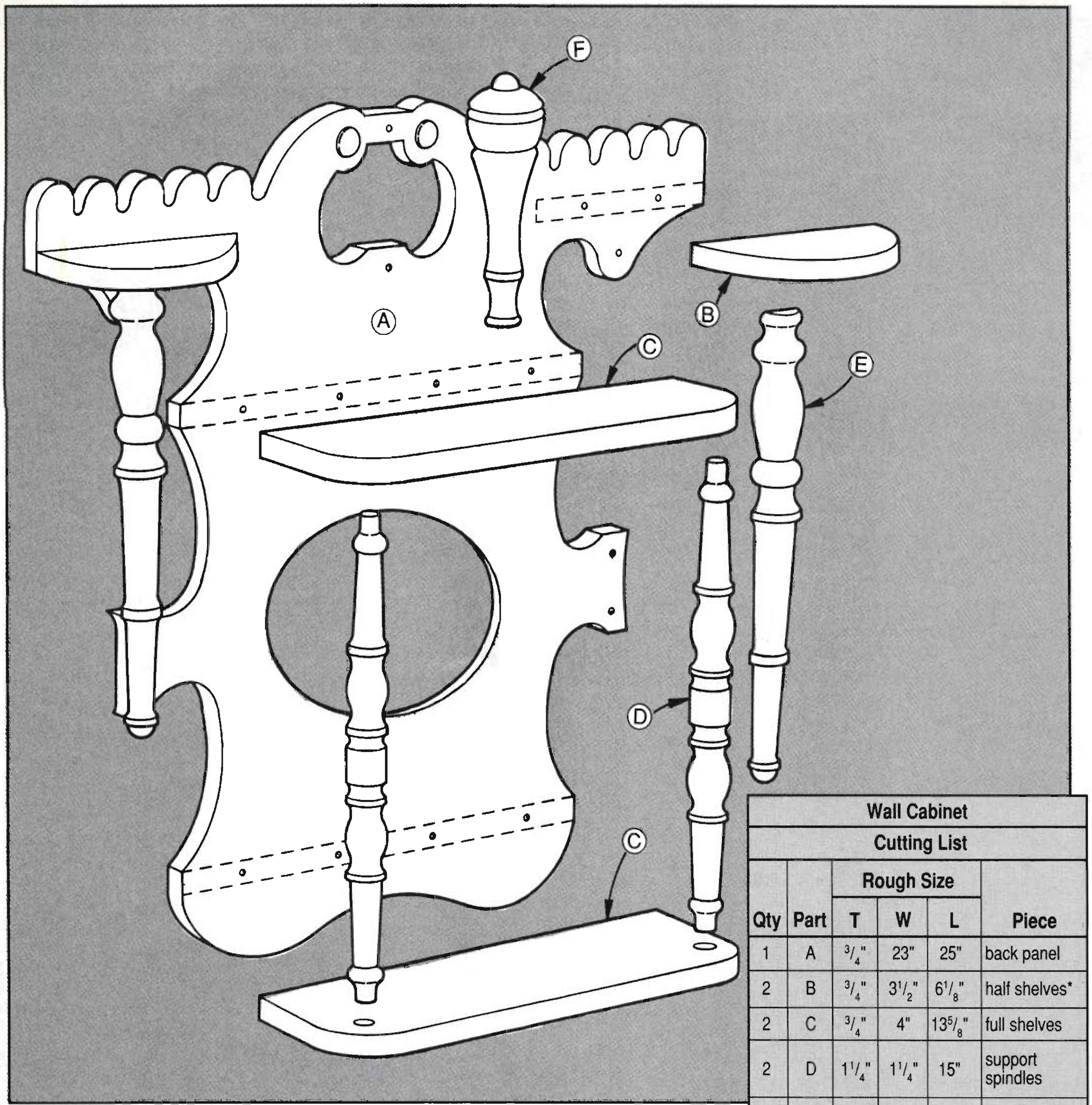
*Devore O. Burch is a woodworker in Fort Worth, Texas.*



illustrations by Tom Larson

cutout indicated on the panel pattern, trace the mirror pattern onto the back of the panel to show the edge of its recess (see Figure 1).

*Drill* holes for #10 × 1-1/2" flat head wood screws at the shelf locations, then put a 3/8" bit in the drill press and bore holes in the round areas at the top of the pattern. Bore starter holes for the two cutouts at the top and the mirror cutout while you're at the drill press. Locate the mirror starting hole close to the edge so you can use the cutout for the two half shelves (B). Bore 1/2" holes for the two buttons at the top.

Saw out the perimeter with a band saw or a sabre saw and smooth the edges with files, sandpaper and, if possible, a sanding drum. Rout a quarter–round edge inside the mirror cutout, then rout the rabbet on the back for the mirror to nest into.

Trace the patterns from the PullOut™ Plans section for the half shelves (B) and the full shelves (C) onto the stock and cut them out. Drill 1/2" holes halfway into the bottom surface of the top shelf and the top surface of the bottom shelf for the support spindles (D). Rout a nice shape on the

**Wall Cabinet**

**Cutting List**

| Qty | Part | Rough Size T | W | L | Piece |
|---|---|---|---|---|---|
| 1 | A | 3/4" | 23" | 25" | back panel |
| 2 | B | 3/4" | 3 1/2" | 6 1/8" | half shelves* |
| 2 | C | 3/4" | 4" | 13 5/8" | full shelves |
| 2 | D | 1 1/4" | 1 1/4" | 15" | support spindles |
| 2 | E | 3/4" | 1 1/2" | 18" | outer split turning pieces ** |
| 2 | F | 1 1/4" | 2 1/2" | 10" | center split turning pieces ** |
| 1 | G | 1/8" | 8 1/4" | 10 1/4" | mirror retainer |

**Supplies**

| | |
|---|---|
| 2 | 1/2" buttons |
| | #10 × 1 1/2" flat head wood screws |
| | #4 × 1/2" flat head wood screws |

* make from mirror cutout
** join face–to–face to make one turning blank

front edges of the shelves.

## Spindles and Split Turnings

Turn the support spindles on the lathe by first marking the transition points as indicated on the pattern. Since this is full size, you can set your calipers right to the different diameters to check your work.

The other turned pieces in this project (E and F) are split turnings. Cut the pieces for each to the rough size given in the cutting list, then put them together to do the turning. The traditional method for making split turnings is to glue a piece of paper between the wood halves, split the halves apart after the turning is complete, then sand off the remaining paper. I prefer to join the two halves together with a wood screw through each end in the scrap area. (Be careful to mark the shoulders well away from the screws.) After turning, simply remove the screws to separate the halves.

I like to finish turned pieces right on the lathe, and I chose to stain these with a 50/50 mix of golden oak and mahogany brown NGR stain. Irregular shapes and turnings lend themselves well to the modern penetrating oil finishes such as Minwax or Watco.

## Assembly

To drill pilot holes for the shelf screws, I found it easiest to clamp the shelves to a two-by-four batten and clamp the batten to the back panel, as shown in Figure 2. That way the two half shelves (B) could be perfectly lined up and held square to the panel. Screw all the shelves to the back panel without glue and apply your finish. Mask off the areas where the split turnings will be glued on so the finish won't interfere with the adhesion.

When the finish is thoroughly dry, glue and screw the shelves to the back panel. Glue the outer split turnings (E) where they contact the back panel at each end, and attach one half of the center split turning (F) to the top of the panel (discard the other half, or use it on another wall cabinet). Apply the buttons and give another coat of finish to the whole project.

After all the parts are finished and assembled, the final operation is to install the mirror. A plain mirror may be used, but if you can have your mirror bevelled, it will add to the authenticity. The mirror retainer (G) is made from 1/8" hardboard and is attached with four #4 × 1/2" flat head wood screws. PW

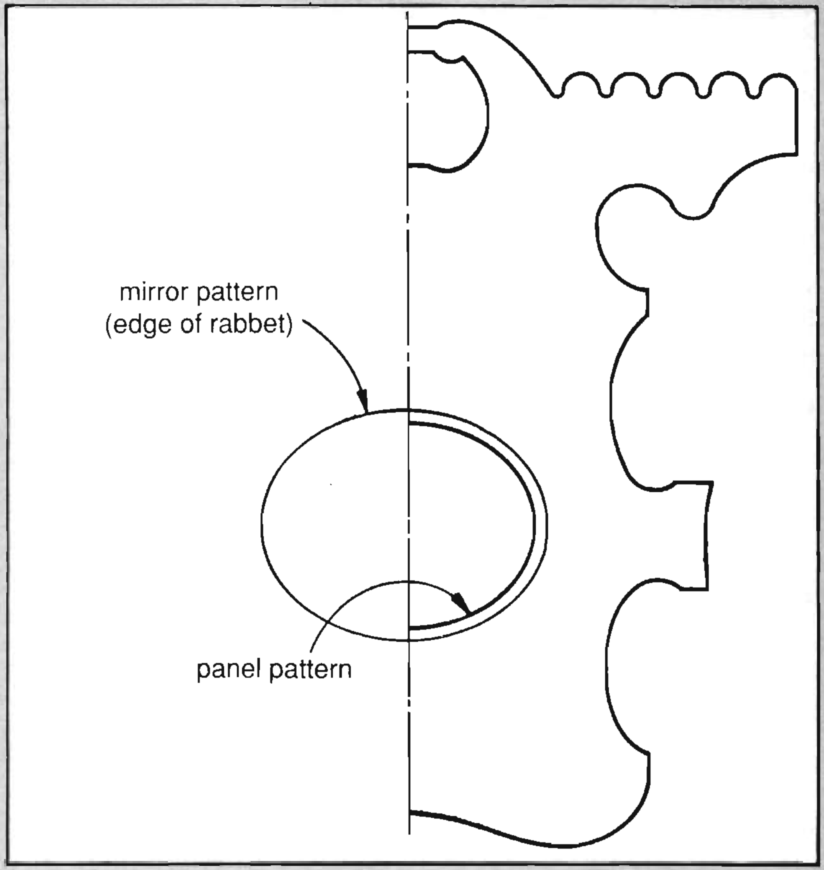
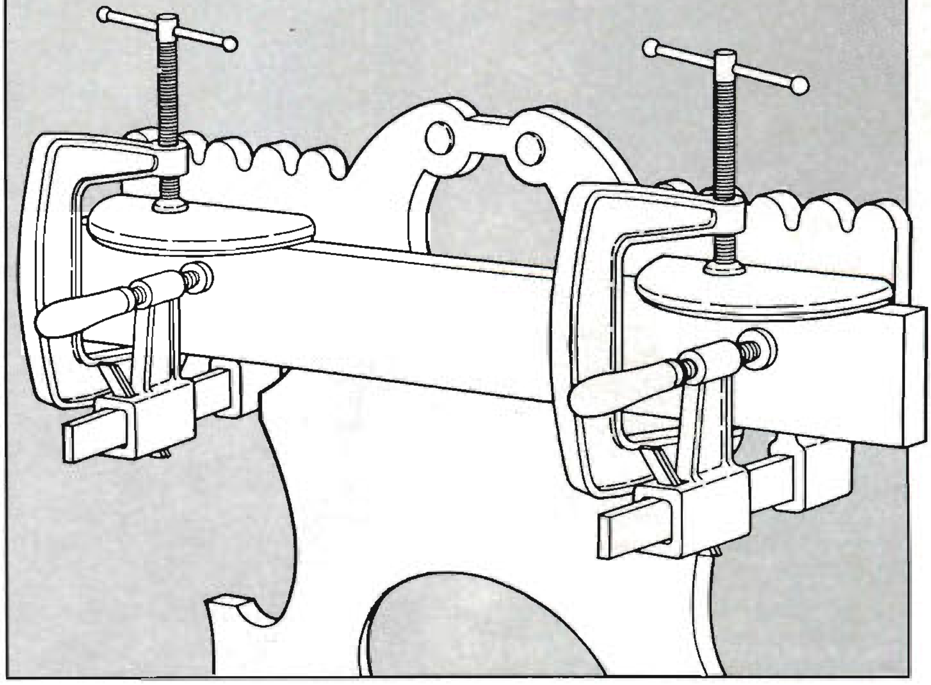


Figure 1

Figure 2



***A Popular Woodworking Project***

# The Audio/Video Cabinet

### by Hugh Foster

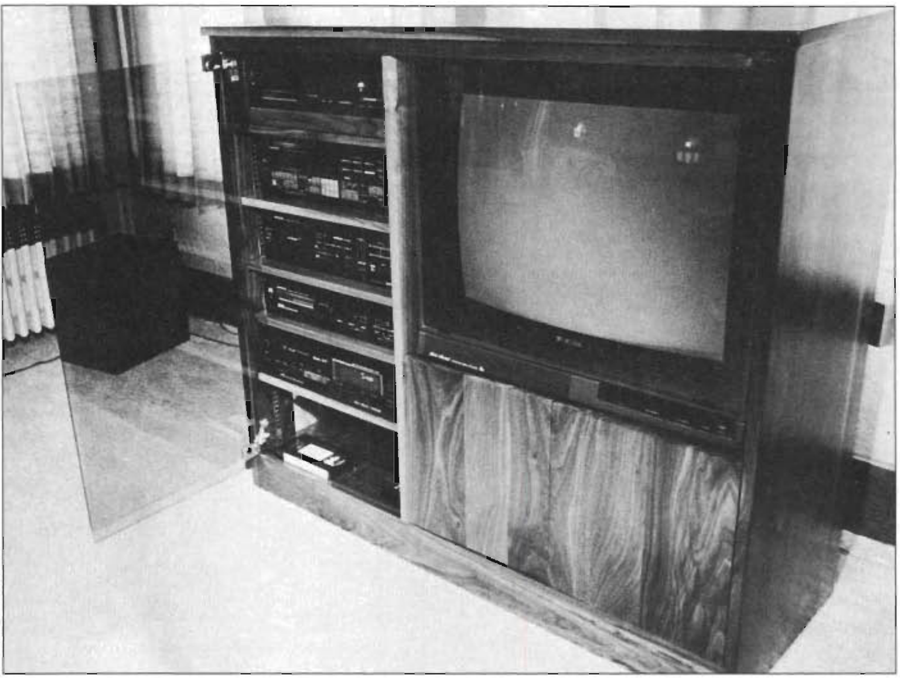


photo by the author

My latest customer was making his first big foray into the wonderful world of high fidelity. He was going to transform his living room and his life of silence with an audiophile system composed of a 26" TV monitor, a video cassette recorder, a compact disc player, a turntable, and a powerful receiver. All these components had to fit into one walnut box.

We came up with this design that features adjustable shelves in the component storage area (including a sliding shelf for the turntable) and a cupboard with another adjustable shelf beneath the TV. The cupboard doors stick up past the TV shelf so that fingers can pull them open from the top, thus eliminating the need for knobs. The European hinges for the cupboard and the glass door are readily available from mail order sources; the glass itself can be cut to size by your local glass merchant and it doesn't have to be drilled for the hinges.

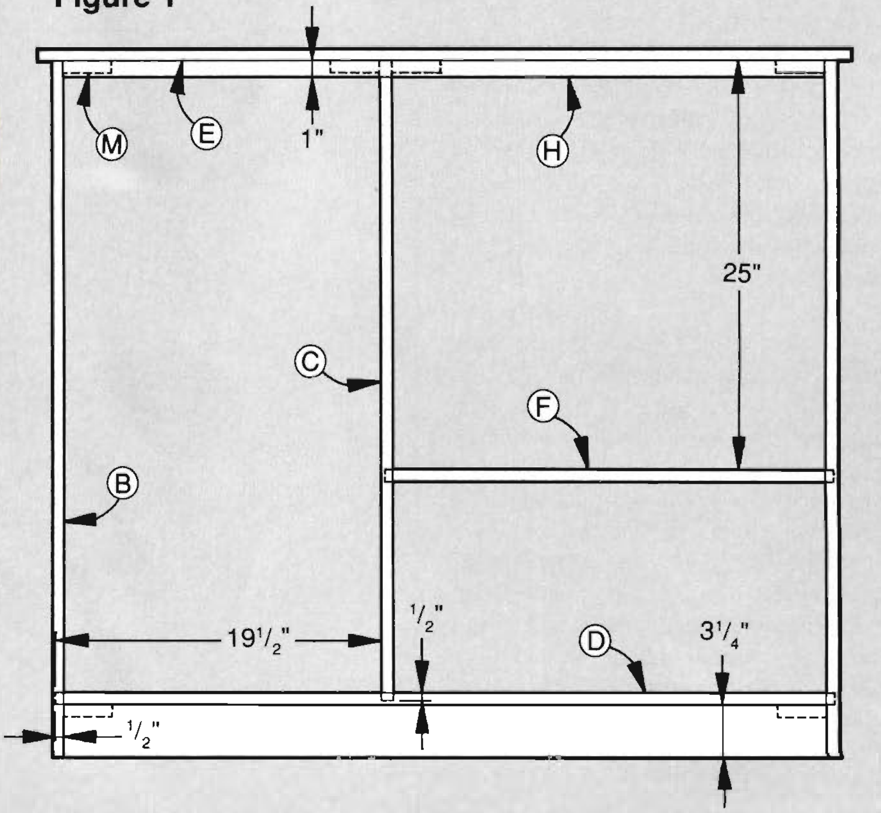
My client didn't want dovetails, so the carcase is assembled with dado joints and reinforced with triangular glue blocks.

Start by making up the panels. You might choose to use a hardwood plywood, in which case you will need to allow for facing all exposed edges when you cut the panels to size. I glued up panels of solid walnut—except for the component shelves (A) which I made out of birch plywood with walnut facing attached to the front edge. Make your facing as wide as you want (3" would suffice) so long as the overall dimensions equal those given in the cutting list.

When the panels are ready, cut the sides (B), partition (C), bottom (D), top (E) and the TV shelf (F) to size according to the cutting list. Orient the parts as to their position in the cabinet and lay out the dadoes as indicated in Figure 1.

I like to cut my dadoes with a router and a T–square. Made like a draftsman's

**Figure 1**



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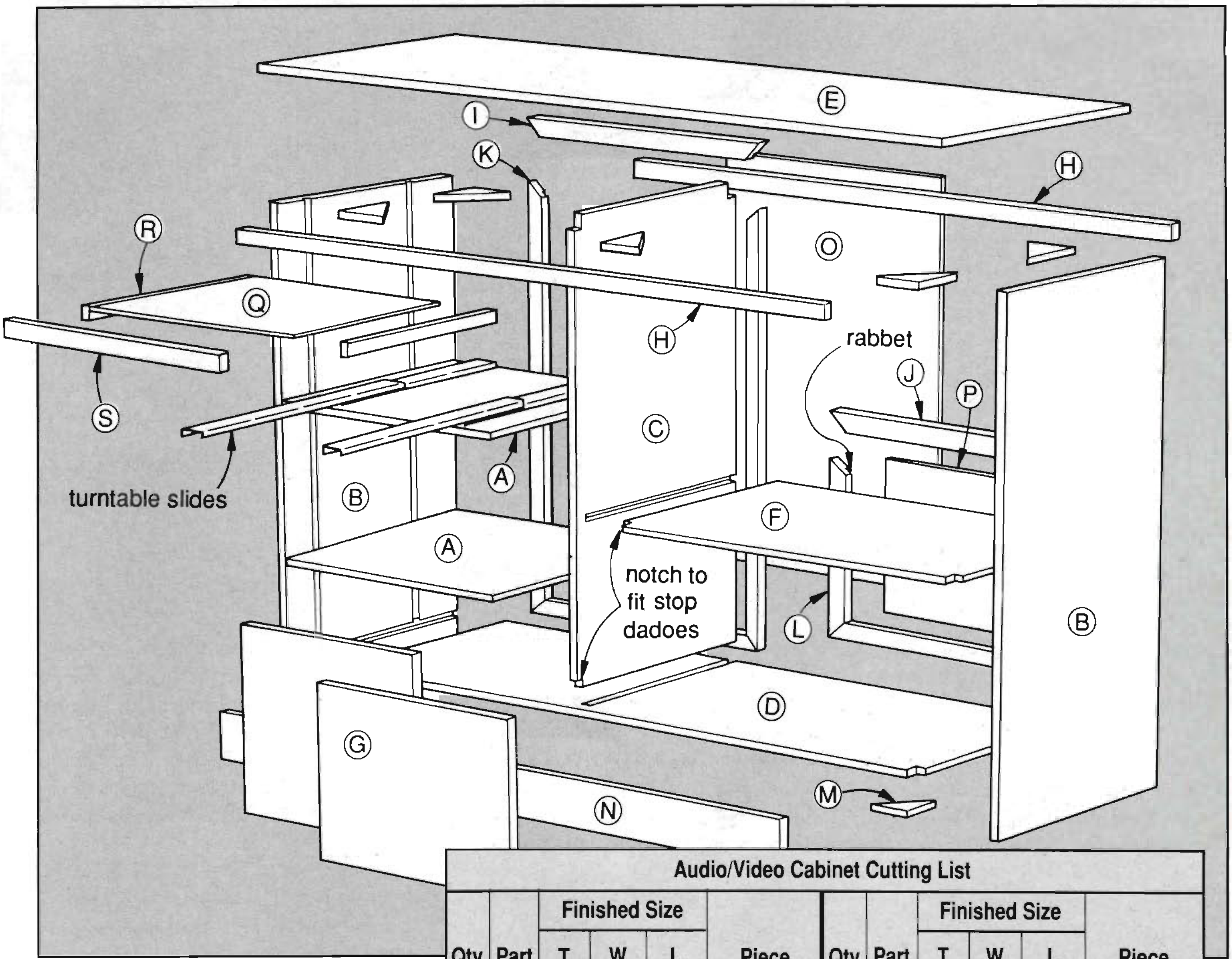
***Hugh Foster** is a part-time furniture designer/builder in Manitowoc, Wisconsin.*



Illustrations by Tom Larson

T–square, this serves as a straightedge to guide the router. The first cut you make will cut into the stock of the square creating a reference point with which to locate the T–square (see Figure 2). I keep a separate T–square for each size bit I use for cutting dadoes.

In this case, it's a 3/4" bit, set to cut 1/2" deep dadoes. The two dadoes that accept the TV shelf (F) should stop 3/4" from the front of the cabinet to allow for the overlapping doors (G). Stop the dadoes for the bottom (D) and the partition (C) at 1/2" from the front edge. Square the ends of the dadoes with a chisel later.

While you've got the router out, cut 5/8" wide × 3/16" deep grooves for shelf standards that run the length of the left side of the cabinet and inside the cupboard area on the right side of the cabinet. (I located these grooves at 3" from either edge.)

In order for the bottom and the partition to fit in their dadoes, you'll need to

**Audio/Video Cabinet Cutting List**

| Qty | Part | Finished Size | | | Piece |
|---|---|---|---|---|---|
| | | T | W | L | |
| 5 | A | 3/4" | 16" | 18 7/8" | component shelves |
| 2 | B | 3/4" | 18" | 43" | sides |
| 1 | C | 3/4" | 18" | 40" | partition |
| 1 | D | 3/4" | 18" | 47 3/4" | bottom |
| 1 | E | 3/4" | 19" | 50" | top |
| 1 | F | 3/4" | 17 1/4" | 28" | TV shelf |
| 2 | G | 3/4" | 13 1/2" | 15" | doors |
| 2 | H | 3/4" | 1 1/4" | 46 3/4" | top rails |
| 2 | I | 3/4" | 1" | 19" | tall back rails |
| 2 | J | 3/4" | 1" | 27" | short back rails |
| 2 | K | 3/4" | 1" | 38" | tall back stiles |
| 2 | L | 3/4" | 1" | 13 1/4" | short back stiles |
| 12 | M | 3/4" | 3" | 3" | corner blocks |
| 2 | N | 3/4" | 3 1/4" | 46 3/4" | toeboards |
| 1 | O | 1/4" | 17 3/4" | 36 3/4" | tall back |
| 1 | P | 1/4" | 25 3/4" | 12 1/4" | short back |
| 1 | Q | 1/4" | 15 1/4" | 17" | turntable shelf |
| 2 | R | 1/2" | 1" | 15 1/4" | side trim |
| 1 | S | 1/2" | 1" | 18" | front trim |
| 1 | T | 3/4" | 16" | 26 7/8" | wide shelf |

**Supplies**

| | | | | | |
|---|---|---|---|---|---|
| 2pr | European style hinges* | | | | |
| 1pr | glass door hinges* | | | | |
| 1pr | turntable slides* | | | | |
| 4pr | 1 5/8" casters | | | | |
| 1 | U | 1/4" | 18 3/4" | 37 3/4" | glass door |
| 28 | shelf clips | | | | |
| 20 | panel–retaining buttons** | | | | |
| 8 | #10 × 1 1/4" rnd. hd. screws w. washers | | | | |
| | shelf standards (18') | | | | |

*Allen Specialty Hardware, 332 W. Bruceton Rd., Pittsburgh, PA 15236
**The Woodworkers' Store, 21801 Industrial Blvd., Rogers, MN 55374

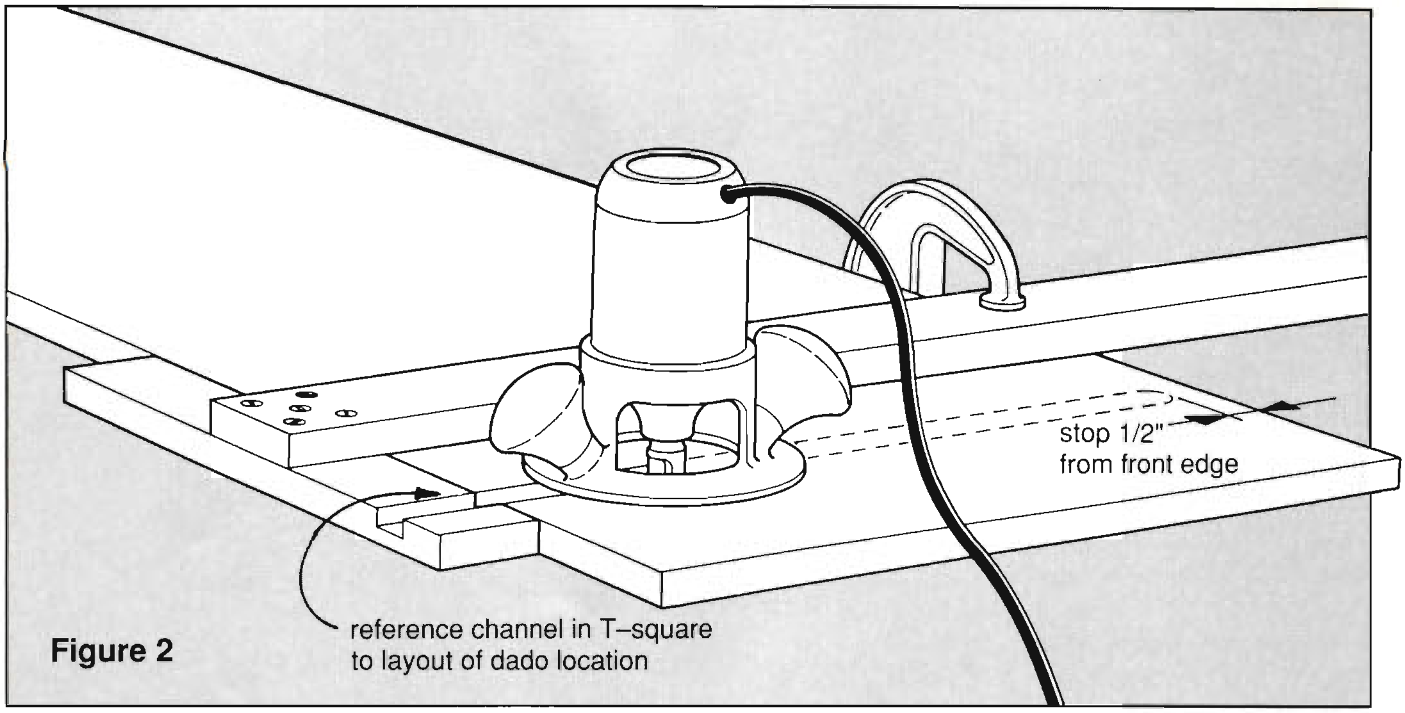
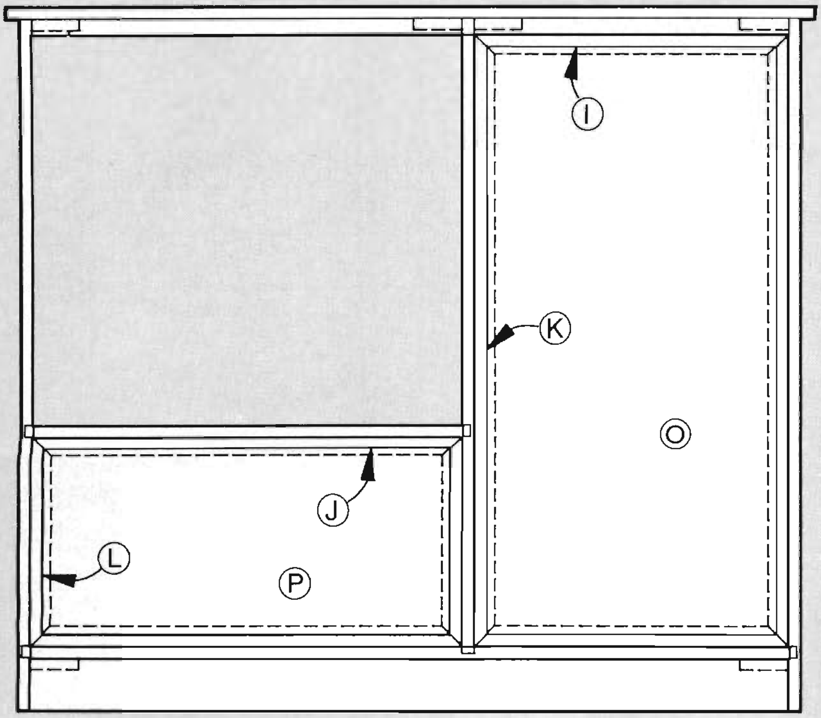


**Figure 2**

cut 1/2" × 1/2" notches in the appropriate corners. Mark and cut these notches carefully because a sloppy fit here will look pretty bad. The partition will also need a 3/4" × 1" notch cut out of both edges at the top to accept the top rails (H).

The cabinet has no back over the TV area because the picture tube sticks out. I installed rabbeted frames that accept removable backs behind the cupboard and the component shelves. To make these frames, first dry–assemble the cabinet and measure the two openings they will fill. Cut the rails (I and J) and stiles (K and L) with mitered ends to fit these openings. Spline the joints and glue up these frames; when they're dry, glue the carcase together using these frames to help square it up. Install the corner blocks (M) with glue and screws in all eight corners at the top, then lay the cabinet upside down and install the two toeboards (N) with four more corner blocks. While I had my cabinet upside down, I applied the finish to the underside and installed the casters.

**Figure 3**



illustrations by Tom Larson

Rout a 1/4" deep × 3/8" wide rabbet into the two back frames to accept the backs (O and P). Cut the backs to size and install them with panel–retaining buttons (see supply list) so they can be removed as necessary for hooking up the stereo components.

The turntable shelf (Q) slides out on special hardware that mounts to the underside and is secured to one of the component shelves (A). I made walnut trim pieces (R and S) to cover the sides and front of the shelf so the hardware would be hidden. When you've decided on the location of this shelf, drive a couple of screws at an angle through the component shelf and into the carcase to keep it from sliding out with the turntable shelf.

Mount the top (E) by driving screws up through the corner blocks. Drill oversize holes in the corner blocks and use round head screws with washers to allow for wood movement. Apply the finish of your choice and hang the doors according to the instructions provided with the hinges. Your completed audio/video cabinet may very well outlast the components that are in it.

A Popular Woodworking Project

# Pushcarts

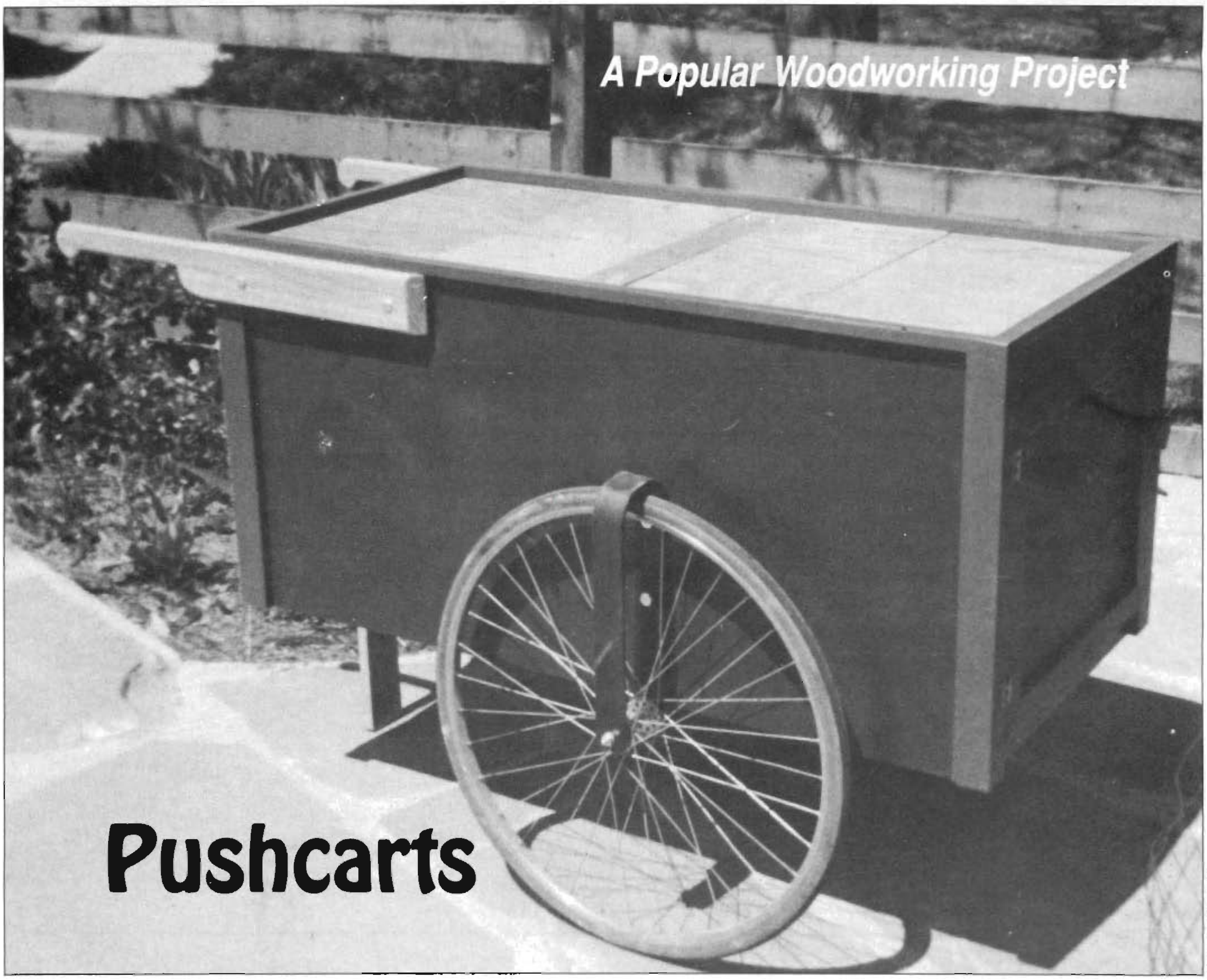


photo by the author

## by Kingsley Hammett

Pushcarts as a form of free enterprise are probably as old as time. Literature is filled with rags–to–riches tales of immigrants who rose from the streets of New York to become retailing giants. Your goals may be more modest: to sell your wooden Christmas tree ornaments once a year at the local mall, or to give a teenager a business experience selling sodas at the softball park, or to serve as a display in front of your florist shop. Whatever the use, the basic pushcart is little more than a box on wheels. This cart was designed to be used to sell drinks and snacks at a Fourth of July parade. It rolls on bicycle wheels, has a door in the back and four panels on top that allow access to the inside.

*Kingsley Hammett is a licensed general contractor in New Mexico. He is also the Editor and Publisher of* New Mexico Business Opportunity News.

illustrations by Tom Larson

Figure 1

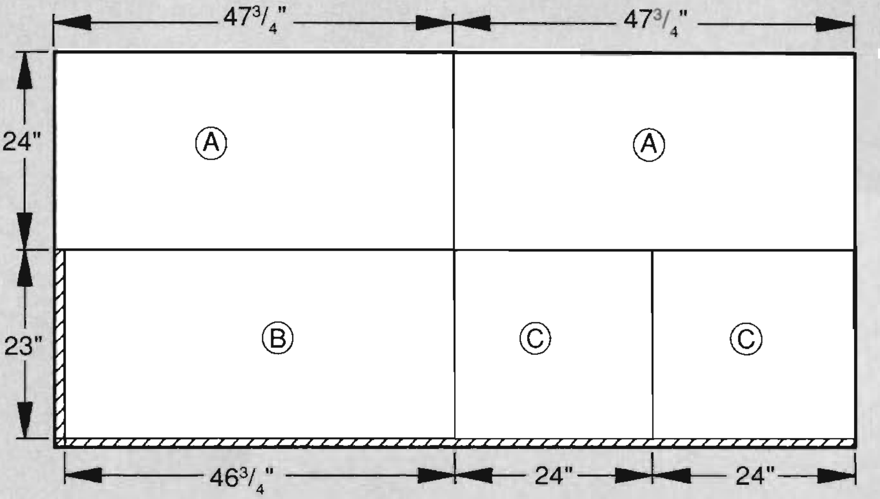


**Figure 2**

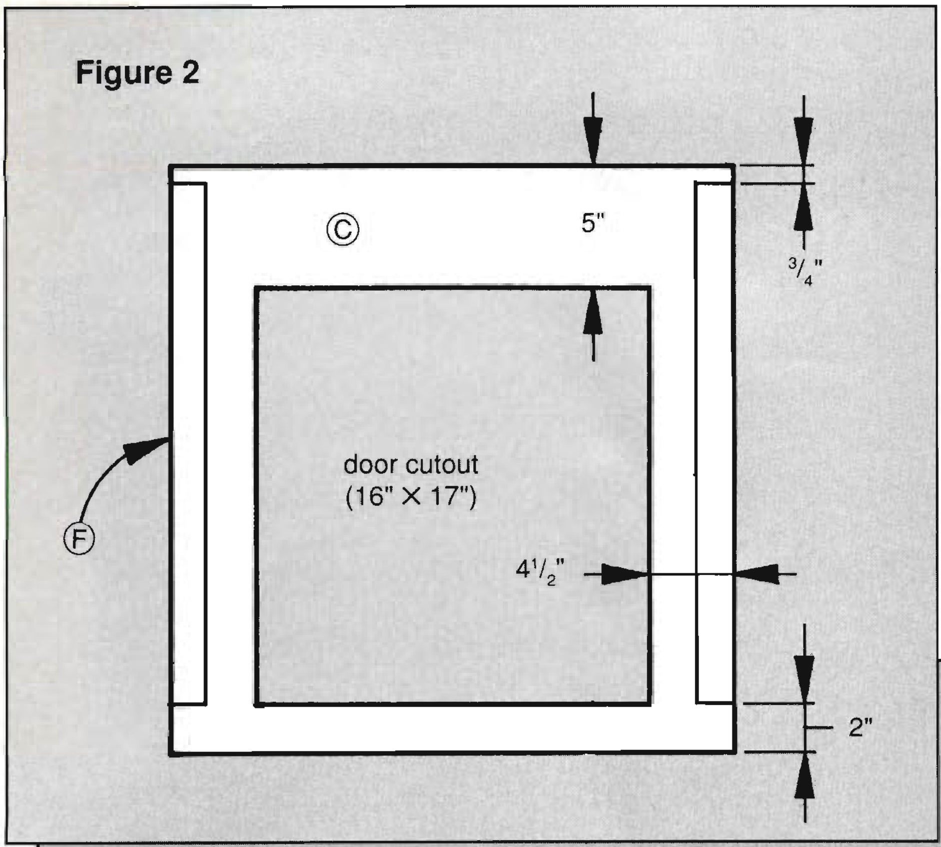
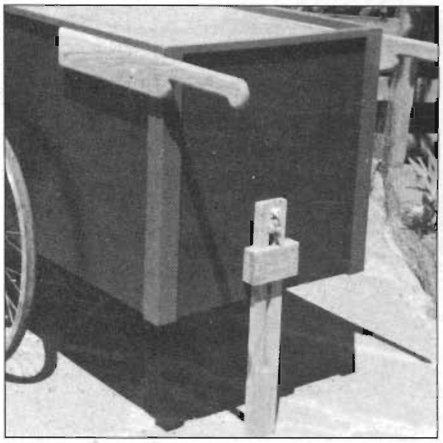
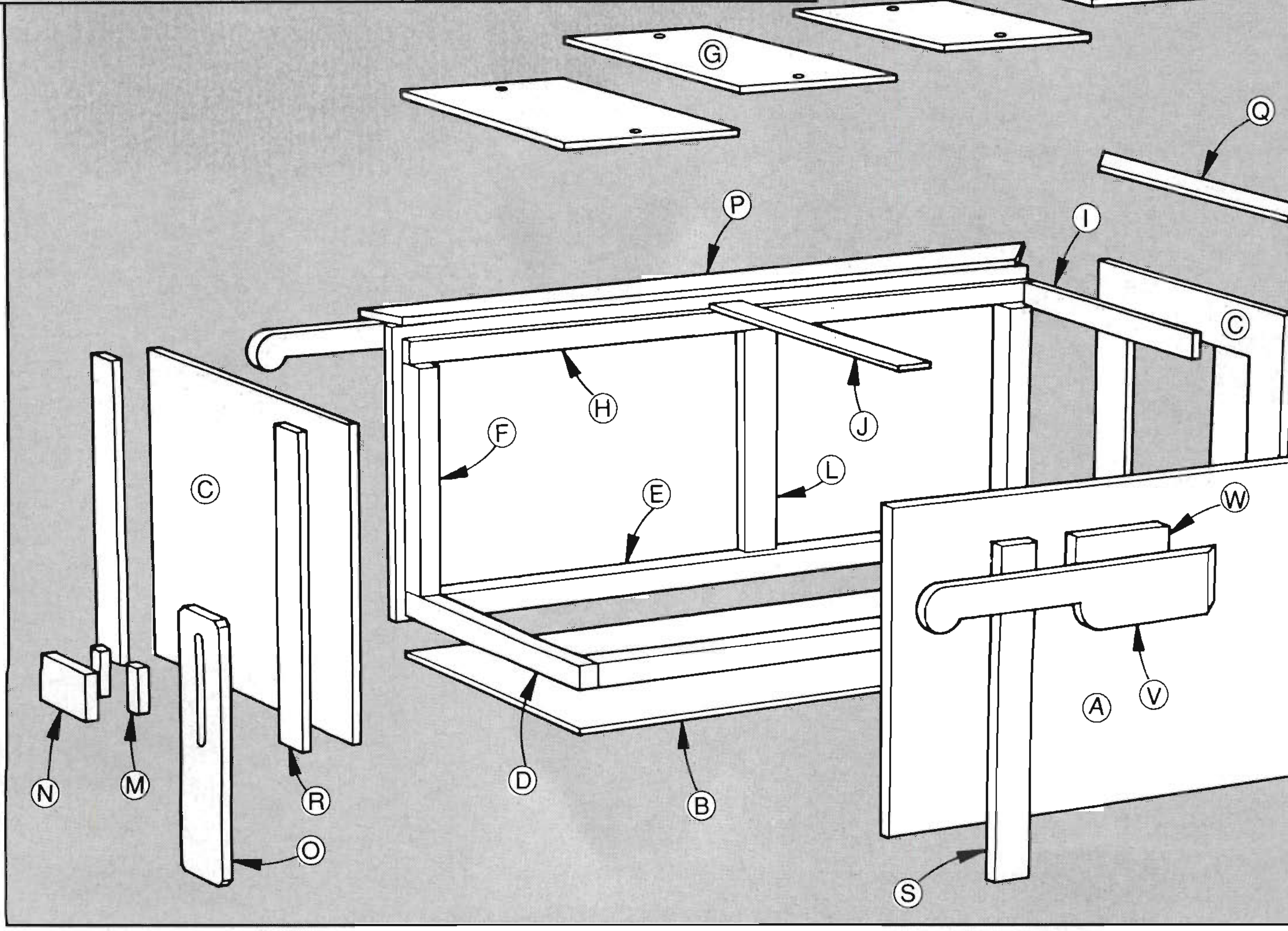


photo by the author

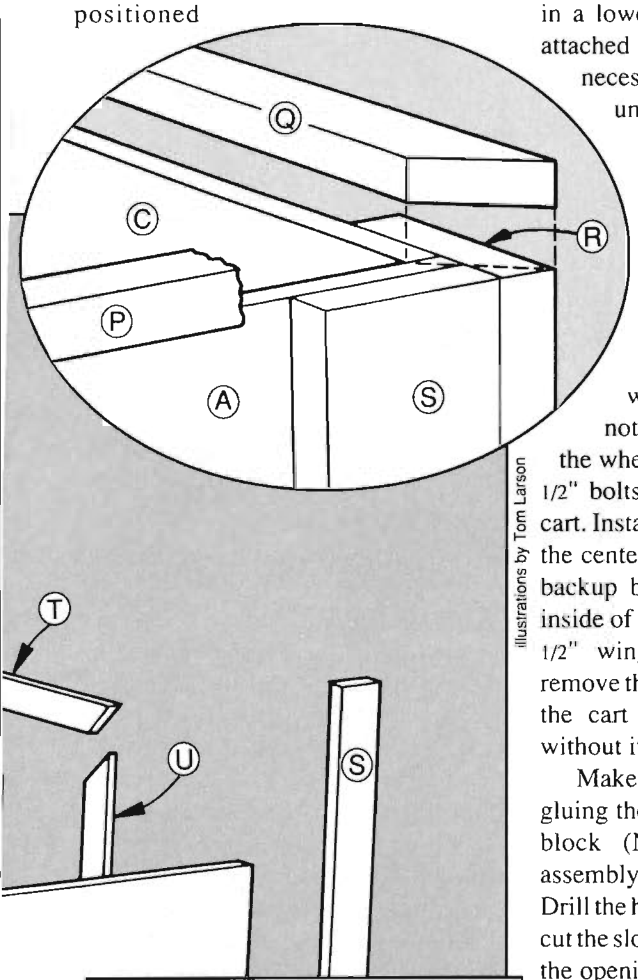


*This drop–leg assembly helps level the cart on uneven terrain. A full–size pattern for the handles (V) can be found in the PullOut™ Plans section.*



Begin by cutting the sides (A), bottom (B) and ends (C) to size according to the cutting list. Cut the pieces from a single sheet of plywood as shown in Figure 1. Cut the door opening in one of the end pieces with a sabre saw to the dimensions shown in Figure 2, and save the cutout to use for the door.

To assemble the body of the cart, first attach the bottom braces (D and E) to the bottom like a frame, using glue and 1-3/4" drywall screws. Attach the vertical braces (F) flush along the vertical edges of the end pieces (C) with their bottom ends positioned 2" away from the bottom edges of the ends (see Figure 2). Attach the ends to the bottom by gluing and screwing them to the bottom end braces, then apply the sides (A).



Illustrations by Tom Larson

| | Supplies |
|---|---|
| 2 | bicycle wheels (w. wing nuts) |
| 2 | custom wheel brackets |
| 4 | 1/2" X 1 3/4" bolts (w. washers & nuts) |
| 4 | 1/2" X 2 1/4" bolts (w. washers & nuts) |
| 1 | 1/2" X 1 1/2" bolt (w. washer &wing nut) |
| 2 | butt hinges |
| 1 | door latch |
| | 1 3/4" drywall screws |

The lids (G) have 3/4" finger holes and fit down between the sides of the pushcart and rest on ledgers (H and I). Cut the ledgers to size, and install them so their top edge is 3/4" below the top edge of the cart.

If you want to use an umbrella with your pushcart, bore an appropriately sized hole in the upper cross piece (J) and in a lower cross piece (K) that can be attached to the bottom (this piece is not necessary if you don't want to use an umbrella). Lay all the lids and the upper cross piece on the ledgers and screw the cross piece in place.

To support the bicycle wheels used in this cart, I made a sort of bicycle fork out of 2" wide flat steel. I had two pieces bent to shape at a welding shop, and had them notch the bottoms of each to accept the wheels and drill holes to accept the 1/2" bolts that attached the forks to the cart. Install these forks about 2" to 3" past the center of the cart and fasten the two backup boards (L) to the sides on the inside of the cart. Attach the wheels with 1/2" wing nuts—this enables you to remove the wheels easily so you can carry the cart in a station wagon or truck without it rolling around.

Make the drop–leg assembly by gluing the small blocks (M) to the cover block (N) and then screwing this assembly to the front end (C) on center. Drill the hole for the bolt and wing nut and cut the slot in the leg (O). Slide the leg into the opening and fasten it with a 1/2" bolt and wing nut.

Miter the ends of the top trim pieces (P and Q) and attach them to the top edges of the cart. Attach the end trim pieces (R) flush to the corner of the cart and then apply the side trim pieces (S) so that they overlap the end trim. Miter the door frame pieces (T and U) and attach them to the cutout piece you saved with a 1" lip all around.

Cut out the handles (V) on the band saw using the full–size patterns in the PullOut™ Plans section at the center of the magazine. Rout the edges with a 1/4" round–over bit and bolt them and their spacer blocks (W) to the sides of the cart.

Paint the cart with bright colors and add some flags or streamers as attention–getters if you like. Now you're in business—no lease, no overhead, and you make your own hours. What could be better? PW

### Pushcart

#### Cutting List

| | | Finished Size | | | |
|---|---|---|---|---|---|
| Qty | Part | T | W | L | Piece |
| 2 | A | 1/2" | 24" | 47 3/4" | sides |
| 1 | B | 1/2" | 23" | 48 3/4" | bottom |
| 2 | C | 1/2" | 23" | 24" | ends |
| 2 | D | 1 1/2" | 1 1/2" | 23" | bottom end braces |
| 2 | E | 1 1/2" | 1/2" | 43 3/4" | bottom side braces |
| 4 | F | 1 1/2" | 1 1/2" | 22" | vertical braces |
| 4 | G | 3/4" | 10 3/4" | 23" | lids |
| 2 | H | 3/4" | 2" | 43 3/4" | side ledgers |
| 2 | I | 3/4" | 2" | 20" | end ledgers |
| 1 | J | 3/4" | 3 1/2" | 23" | upper cross piece |
| 1 | K | 1/2" | 3 1/2" | 20" | lower cross piece * |
| 2 | L | 3/4" | 3 1/2" | 19 1/4" | backup boards |
| 2 | M | 3/4" | 7/8" | 4" | small blocks |
| 1 | N | 3/4" | 4" | 5 1/2" | cover block |
| 1 | O | 3/4" | 3 7/8" | 24" | leg |
| 2 | P | 3/4" | 1 1/4" | 49" | long top trim pieces |
| 2 | Q | 3/4" | 1 1/4" | 25 1/4" | short top trim pieces |
| 4 | R | 3/4" | 2 1/2" | 24" | end trim pieces |
| 4 | S | 3/4" | 3 1/4" | 24" | side trim pieces |
| 2 | T | 3/4" | 2" | 18" | horizontal door frame pieces |
| 2 | U | 3/4" | 2" | 19" | vertical door frame pieces |
| 2 | V | 3/4" | 4" | 20" | handles |
| 2 | W | 3/4" | 3 1/2" | 8 3/4" | spacer blocks |

* optional

# Wine Rack/End Table

### by Ray Day

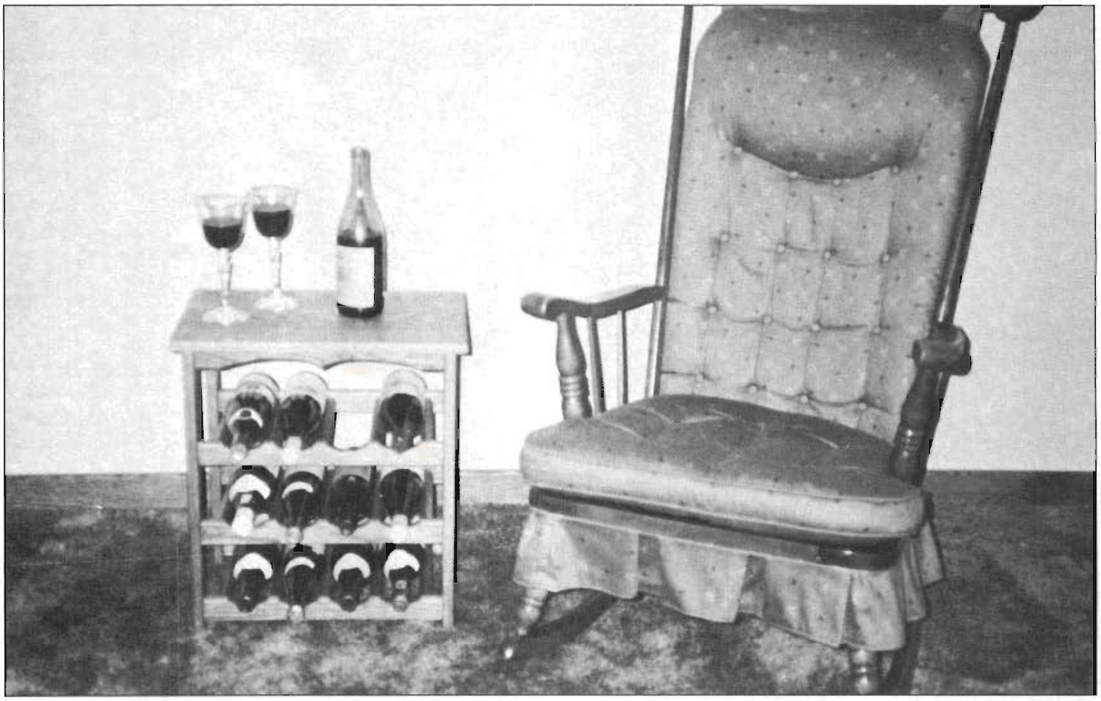


photo by the author

For those who enjoy a variety of wine, some kind of storage is a necessity. A wine rack is useful for storing the bottles on their sides, but store–bought racks often present another problem—where do you put the rack?

I designed a wine rack that serves a function in addition to the storage of wine; I added a top so it could also serve as a table. This piece of furniture has storage for twelve wine bottles and looks great in a den, family room, bar area, or any other convenient spot.

I used mortise and tenon joinery throughout the project. The cross pieces for the bottles (A) are joined to the rails (B) with round tenons, while all the rails are fastened to the legs (C) with 1/4" X 1" X 1/2" long tenons (see Figure 1a).

Although I constructed this wine rack/ end table from red oak, it can be made from any lumber you select. All pieces are from 4/4 stock, and 10–12 board feet will suffice to complete the project.

Begin construction by edge–gluing enough boards to make up the top (D). Make the piece wider and longer than necessary so it can be cut to size later.

While the top is drying, cut all the other pieces to the finished sizes indicated in the cutting list. Note that all the rails (B and E) and legs (C) are 1-1/2" wide, so they can be ripped at the same time. It is best to rip them slightly wider than necessary and then bring them to their finished width on a jointer after cutting them to length. The length specified in the cutting list includes 1/2" tenons on each end.

For the cross pieces (A) you have three choices for joinery. I used a round tenon cutter on a drill press to cut 1/2" diameter X 1/2" long tenons on the ends of the braces. An alternative is to cut the pieces 1" shorter than indicated on the cutting list, and use 3/8" X 1" glue dowels to join them to the rails. A third possibility is to just use 3/4" dowel rods that are 10-1/2" long for the cross pieces. If this last option is selected, be sure to drill the 3/4" holes in the front and rear rails exactly 1/2" deep so the shelf assemblies measure 11" from front to back. The dowels will need to be bevelled on the ends for glue relief. For the other two methods, the holes can be drilled 9/16" deep for glue relief.

Once all pieces are cut and jointed to finished size, cut all the mortises in the legs for the rails as shown in Figure 2. Cut the mortises on one face of the legs, then orient them right to left and front to back to choose the edges that will receive the mortises for the end rails (E). I used a router mounted on a router table with a 1/4" straight bit to cut the mortises. Since all the mortises are centered on the legs, the ones on the faces can all be cut with the same set–up. You'll have to adjust the fence for the mortises on the edges.

Cut the tenons on all the rails. To do this you can set a 1/2" wide dado head to cut 1/4" deep, position a wooden auxiliary fence to act as a stop, and make a pass on all four surfaces at each end. I used a tenoning jig and miter gauge to cut the tenon cheeks and shoulders with a regular blade instead of a dado head set. If you cut your mortises with a router, you will have to round the corners of the tenons with a file to make them fit the mortises.

Next, drill five holes each in six of the eight rails to accept the cross pieces. The hole diameter (1/2", 3/8", or 3/4") will depend on the method you selected for joining the braces to the rails. Regardless

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*Ray Day is the Editor of* Wood Matters, *a newsletter about woodworking and the owner of* A Day's Work, *a small furnituremaking and plans shop in Iowa City, IA.*

of which size you use, the centers should be located as indicated in Figure 2. On the two remaining rails and the two end rails (E), cut a 1/8" wide × 1/2" deep groove on the inside face near the top edge. This groove is for table irons to secure the top. Copy the Shelf Rail Pattern from the PullOut™ Plans section and lay it out on one of the rails. Tape three rails together and cut out and sand the curves. Use the Top Rail Pattern on one of the top rails. I like to round the top edges of the shelf rails, the bottom edges of the top rails and all edges of the cross pieces with a 1/4" round–over bit on a router. I even rounded the edges of the legs; you may or may not select this option. Regardless, sand all the parts before beginning assembly.

Assembly is easiest if you approach it as a series of subassemblies. Put together three shelves first; each shelf consists of five cross pieces (A) glued between two rails (B). If you made your cross pieces the way I made mine, position them at 45° to the edge of the rails so that bottles will be supported by the sloping surfaces. Clamp these shelf subassemblies with a bar clamp at each cross piece position.

Make two more subassemblies by gluing an end rail (E) between each of two pairs of legs. When these subassemblies are dry, glue the shelf assemblies and the top rails between the leg assemblies.

Trim the top (A) to finished size and rout an edge detail that appeals to you on all but the back edge. Stain and finish the

**Figure 1**

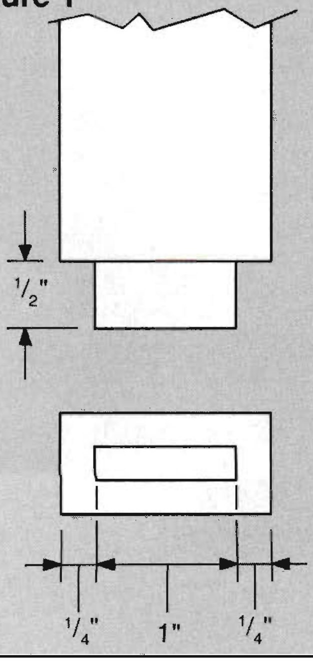
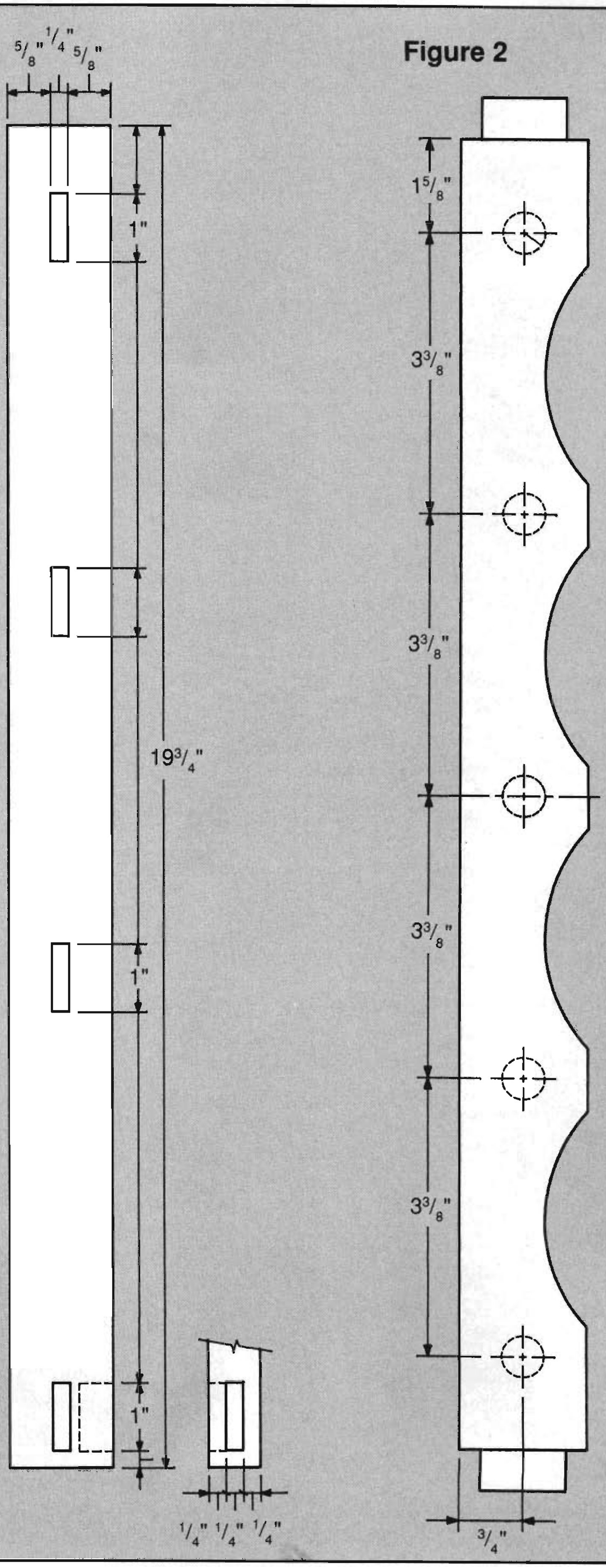
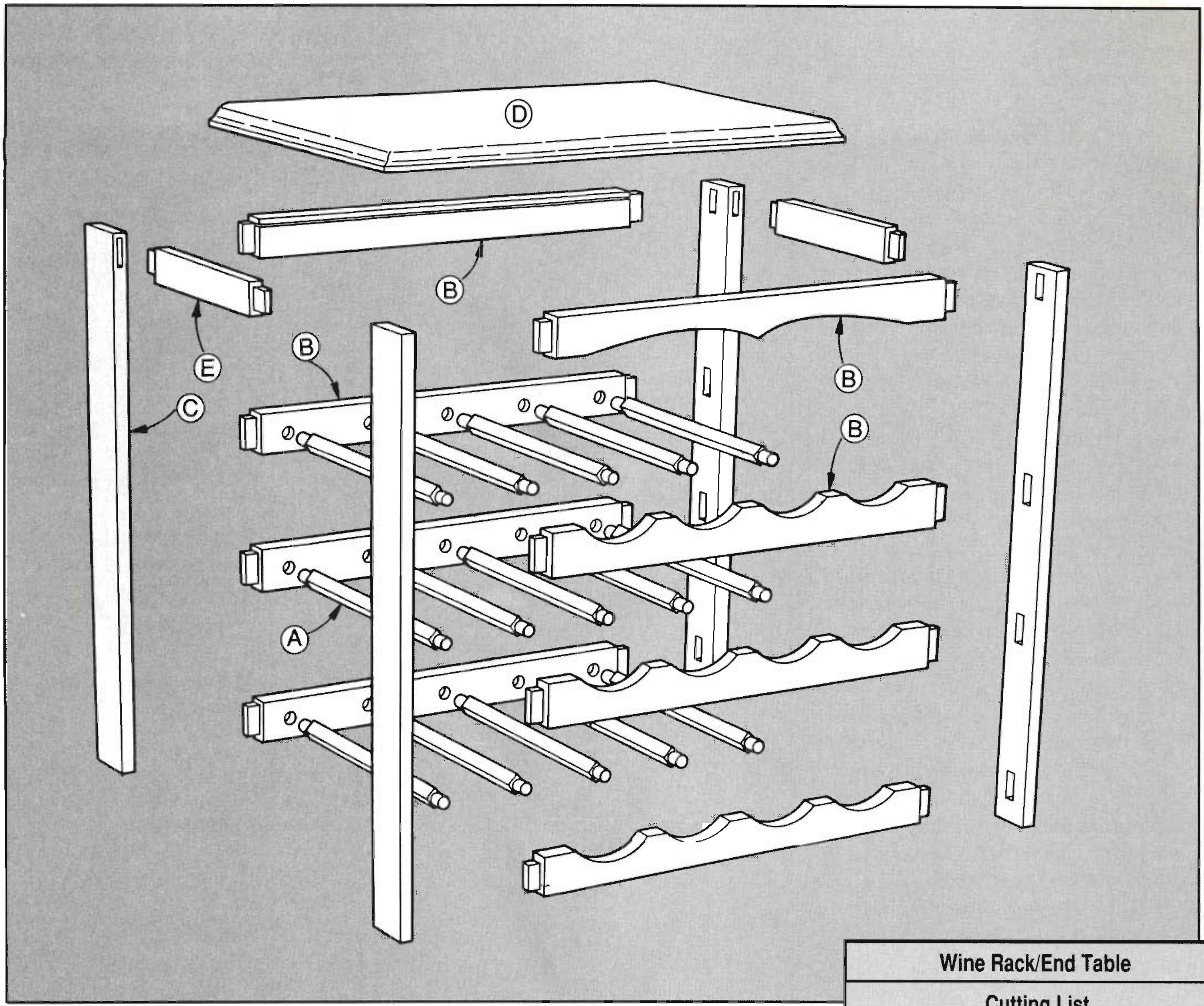


**Figure 2**



illustrations by Tom Larson



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*Build each shelf as a separate subassembly.*

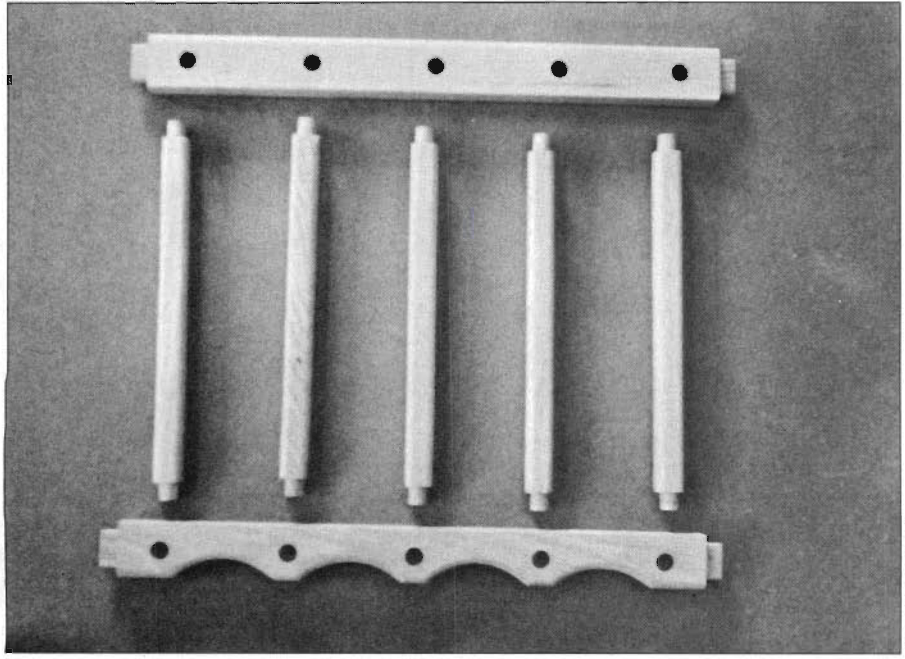

photo by the author

| Wine Rack/End Table | | | | | |
|---|---|---|---|---|---|
| **Cutting List** | | | | | |
| | | **Finished Size** | | | |
| **Qty** | **Part** | **T** | **W** | **L** | **Piece** |
| 15 | A | 3/4" | 3/4" | 10 1/2" | cross pieces |
| 8 | B | 3/4" | 1 1/2" | 16 3/4" | rails |
| 4 | C | 3/4" | 1 1/2" | 19 3/4" | legs |
| 1 | D | 3/4" | 12 1/2" | 18 3/4" | top |
| 2 | E | 3/4" | 1 1/2" | 9 3/4" | end rails |
| **Supplies** | | | | | |
| 8 | table irons | | | | |

top and the base separately. Then lay the top upside down on your workbench, and position the base so the back of the top is flush with the back of the rear legs and the base is centered side to side. Secure the top with table irons, then celebrate with a crisp Chardonnay. **PW**

# Calendar

## Events of Interest to Woodworkers

*If your group is having an event you would like other woodworkers to hear about, please send us all pertinent information at least three months before the opening date. We will publish it for you in **Calendar** free of charge.*

**June 1—July 2, Seattle, WA**

A one–man show of work by furnituremaker Grady Mathews will be presented at the Northwest Gallery of Fine Woodworking, at 202 First Avenue South, Seattle, WA 98104, Tel. (206) 625-0542. Gallery hours are Mon–Sat 10:30 to 5:30, and Sun 12:00 to 5:00.

**June 2—4, Oklahoma City, OK**

A show will be held by the Oklahoma Woodcarvers Club at the Penn Square Mall, N.W. Highway and Pennsylvania, Oklahoma City. For more information, contact: Jim Crist, 2000 N. Purdue, Oklahoma City, OK 73127, Tel. (405) 943-8107.

**June 5—June 16, Fort Bragg, CA**

A course entitled *Basic Carving* will be presented by The College of the Redwoods Fine Woodworking program. The course is designed for beginning and intermediate woodworkers, and will run from 8:30 to 5:30 pm. in the college's Fine Woodworking shop. The fee is $10 for California residents, and $147.00 for out–of–state tuition. For more information, contact: College of the Redwoods, 440 Alger Street, Fort Bragg, CA 95437.

**June 20—25, W. Springfield, MA**

The Original Rhinebeck Craft Fair will be held at the Eastern States Exposition, 1305 Memorial Avenue, West Springfield, MA. For more information, contact the ACC Crafts Fairs at P.O. Box 10, 256 Main Street, New Paltz, NY 12561, Tel. (914) 255-0039.

**June 26—July 14, Fort Bragg, CA**

A course entitled *Introduction to Fine Woodworking Tools & Techniques* will be presented by The College of the Redwoods Fine Woodworking program. The course is designed for beginning and intermediate woodworkers, and will run from 8:30 to 5:30 pm. at the college's Fine Woodworking shop.The fee is $15 for California residents, and $249.00 for out–of–state tuition. For more information, contact: College of the Redwoods, 440 Alger Street, Fort Bragg, CA 95437.

**July 3—7, Marshall, NC**

A course on Japanese woodworking will be given by Carl Swensen, including instruction on how to fine–tune and sharpen Japanese hand tools, followed by making a joined woodworker's tool box with a sliding lid. Course presented by the Country Workshops, 90 Mill Creek Road, Marshall, NC 28753, Tel. (704) 656-2280. Tuition is $250 for the 5–day class, and includes Louise Langsner's famous home cooking. Camping and dormitory facilities available. For more information, contact Drew Langsner at the above address.

**July 9—August 12, St. Louis, MO**

*The Turner's Challenge*, the third annual exhibition of lathe–turned objects, will present the newest work of 65 renowned international artists. For more information, contact; Wood Turning Center, P.O. Box 25706, Philadelphia, PA 19144, Tel. (215) 844-2188.

**July 7—9, Tulsa, OK**

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# Calendar

continued

Association will hold its thirteenth annual National Show on July 7, 8 and 9, at the Kensington Galleria Shopping Mall, 71st and South Lewis, Tulsa, OK 74011. For more information, contact Dale Hill, Rt. 1 Box 75, Broken Arrow, Oklahoma 74011, Tel. (918) 455-8683.

### July 17—August 11, Ft. Bragg, CA

A course entitled *Fine Woodworking Projects* will be presented by The College of the Redwoods Fine Woodworking program. The course is designed for beginning and intermediate woodworkers, and will run from 8:30 to 5:30 pm. at the college's Fine Woodworking shop.The fee is $22.50 for California residents and $441.00 for out–of–state tuition. For more information, contact: College of the Redwoods, 440 Alger Street, Fort Bragg, CA 95437.

### July 17—21, Marshall, NC

A course on *Green Woodworking* will be given by Drew Langsner, including instruction on riving, shaving, hewing and bending. Projects include making a firewood tote and a large dough trough. Course presented by the Country Workshops, 90 Mill Creek Road, Marshall, NC 28753, Tel. (704) 656-2280. Tuition is $250 for the 5–day class, and includes Louise Langsner's famous home cooking. Camping and dormitory facilities available. For more information, contact Drew Langsner at the above address.

### June 22—25, Nazereth, PA

Symposium 89, a national exposition of stringed musical instrument making and repair, will be held on the campus of Lafayette College, 14 South Broad Street, Nazereth, PA. The Symposium will feature lectures, workshops, and demonstrations from many of the key people in the instrument making field. Application deadline is June 10, 1989. Early registration is recommended. For more information, contact: Symposium 89, 14 South Broad Street, Nazereth, PA, Tel. (215) 759-7100

### July 23—28, Blue Earth, MN

The Seventh Annual Upper Midwest Woodcarving Exhibition, a juried show, will be held by the Royal Chiselers Wood Carvers Club. For more information, contact: Harley Schmitgen, 311 East 14th St., Blue Earth. MN 56013, Tel. (507) 526-2777.

### August 7–11, Richmond, CA

The Lumber Drying Short Course features such topics as drying fundamentals, controlling defect development, use and maintenance of equipment, reducing costs and increasing quality. The course includes lectures, demonstrations and lab exercises. Enrollment is limited to 25 and the fee is $300. For more information, contact Tom Breiner, UC Forest Products Laboratory, 1301 South 46th St., Richmond, CA 94804, Tel. (415) 231-9487.

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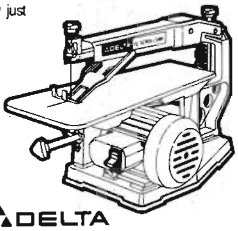

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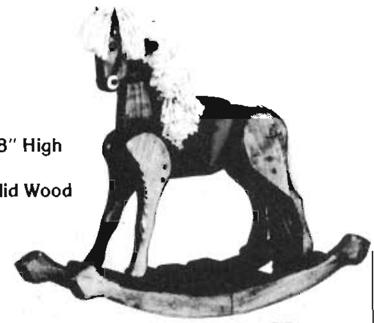

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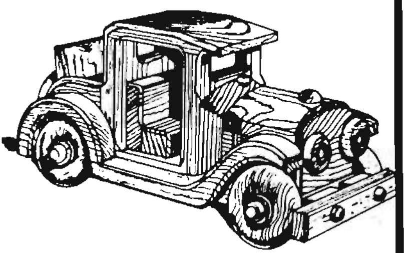

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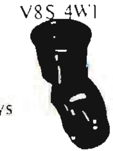

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### *Focus on Carving*

# Carving Carousel Animals - Part 2

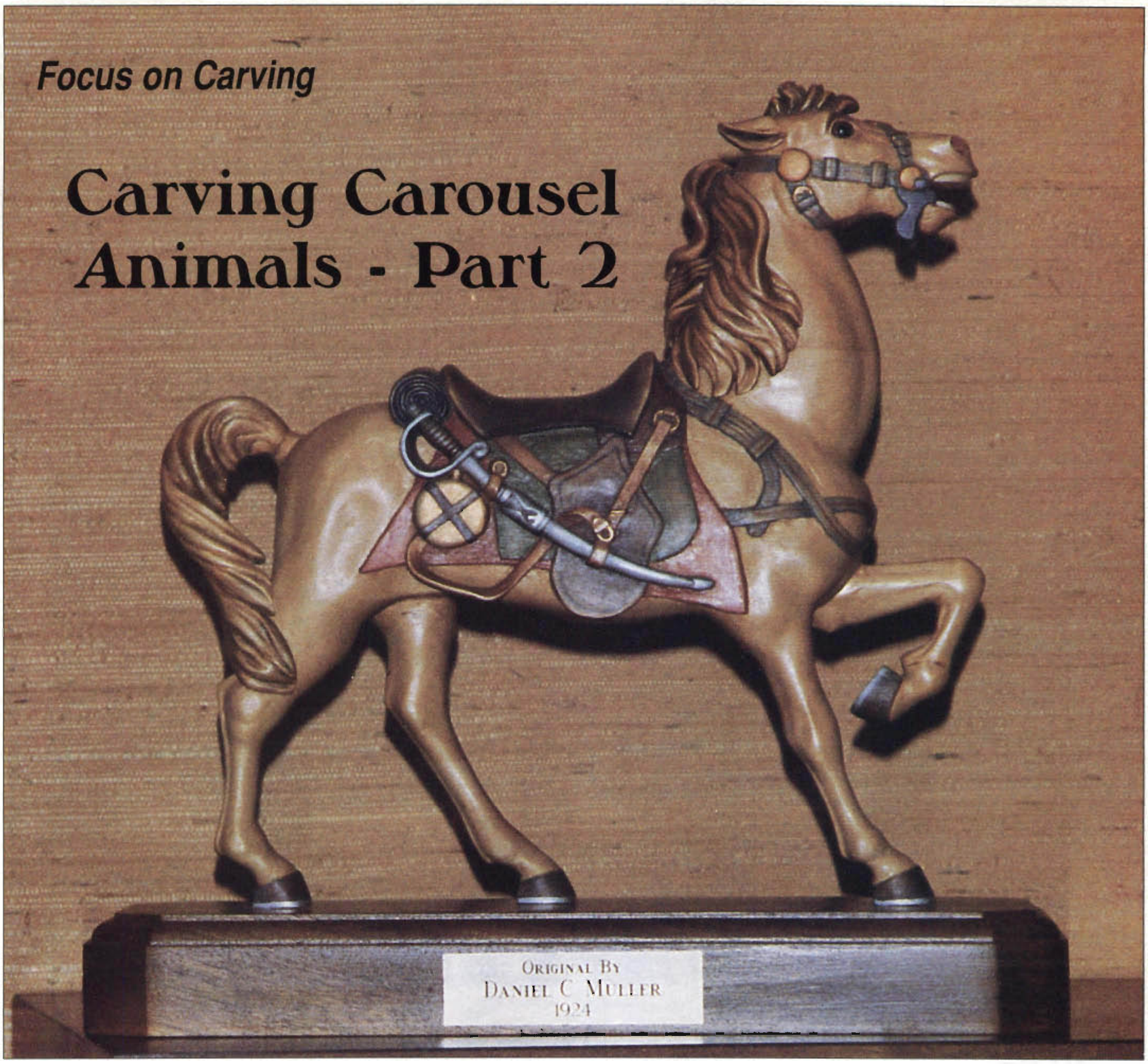

photo by the author

### by William H. McMaster

In the last issue of *PW* (April/May 1989), I told some of the history of the carousel, gave a pattern for "Rosebud" and described three recognized styles of carving carousel animals. In this article I shall present patterns of horses representing each of the three styles. These patterns are one-tenth scale, which is one of the most common sizes for woodcarvers and can be carved in 1-1/4" thick wood. You can enlarge or reduce them further to obtain another scale; however, if you plan to carve all the animals in this collection, you should carve them all at the same scale. "Bubbles" and "Lillie Belle" are smaller horses because they are from the smaller traveling carousels which typically had animals that were three feet long, instead of four feet long.

The horses were always the most popular animals on the carousel, therefore any collection should consist mostly of horses. The patterns presented here will help you get started, but if you truly desire to make an authentic copy, I would suggest that you refer to photographs of the original carvings. A reference for each horse will be given with its description, and you can get the books from your library or bookseller. From these photographs you can also see the original colors of the painted horses.

As mentioned in the last issue, you will need a holding tab for clamping the work while carving these horses. Figure 1 shows where I placed mine. For a small "Military Mueller" the size of this pattern, I would place it above the saddle so that there is space to work on the legs. The other two horses can have *theirs below* the belly—"Bubbles" definitely so, because of the intricately carved leopard skin over the saddle, and "Lillie Belle" since her legs are placed in the flying gallop pose giving you plenty of room to work on them.

Again, if you have any problems envisioning the piece, I would definitely recommend that you make a clay model

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***William H. McMaster** is Chief of the Education Division of the California Carvers' Guild. His "Focus on Carving" is a regular feature in* PW.

before starting to carve. The armature arrangement shown for "Rosebud" in the previous issue is also appropriate for these horses.

"Bubbles" and "Lillie Belle" are both jumpers so you will have to plan ahead for the support pole. The patterns show where the pole should be placed. Since we are using a holding tab in this same area, the tab should be placed behind the location of the hole. It is easiest to drill this hole before you start carving. I do not favor a pole going all the way through the horse as you see in many ceramic renditions. I prefer to follow the lead of many museums and private collectors and use the pole only to support the animal. After all, the purpose of our art is to emphasize the carousel animal.

After bandsawing out the pattern, the next step is to separate the legs. Do this by removing wood to the center of the block for each leg. This assures that they end up on the correct side of the horse. Do not go much further than halfway, since the legs should be carved from the outside first to assure that you leave enough wood to carve the legs correctly.

When carving these horses, make sure that each horse's hoofs are all the same size. Draw a template and make frequent measurements. It's very easy to mismatch them and this really detracts from the finished carving.

The patterns for these horses are for the "romance" side only. The off–side is just a simplified version, so you do not need detailed plans. However, you should sketch the position of the off–side legs on the plastic pattern you make to guide your carving of the details.

### Philadelphia Style

In the Philadelphia style the emphasis was on realism and classic elegance. These designs were dominated by the Gustav Dentzel Company and the Philadelphia Toboggan Company.

In 1860, at the age of twenty, Dentzel arrived alone from Kreuznach, Germany and opened a cabinet shop in Philadelphia. In Germany, his family had had experience in carousel carving, so after he became established, he built a small carousel to test the American public's reaction. The response was so enthusiastic, he redirected his business to carousels in 1867. This was the beginning of the American carousel. He was the first to use steam engines to power his carousels, and his factory remained in business until 1928. They produced one to two carousels a year, each custom built. His horses are beautifully proportioned, graceful, and have lifelike expressions. The Dentzel company employed many of the most famous carousel carvers.

The lead horse in this series is known as "Military Mueller" and was carved by Daniel C. Mueller, who sometimes worked for the Gustav Dentzel Company. Like most of the prominent carousel carvers of the time, Mueller was also an immigrant. However, his art education was more extensive than the others as he attended the Pennsylvania Academy of Fine Arts and was a sculptor in stone as well as wood. Mueller's horses were the most realistic of all the American carvers. They were based on the Arabian stallion, and he favored Civil War and circus trappings for his horses. A good picture of the original horse for this pattern is shown on page 61 of *The Carousel Animal* by Tobin

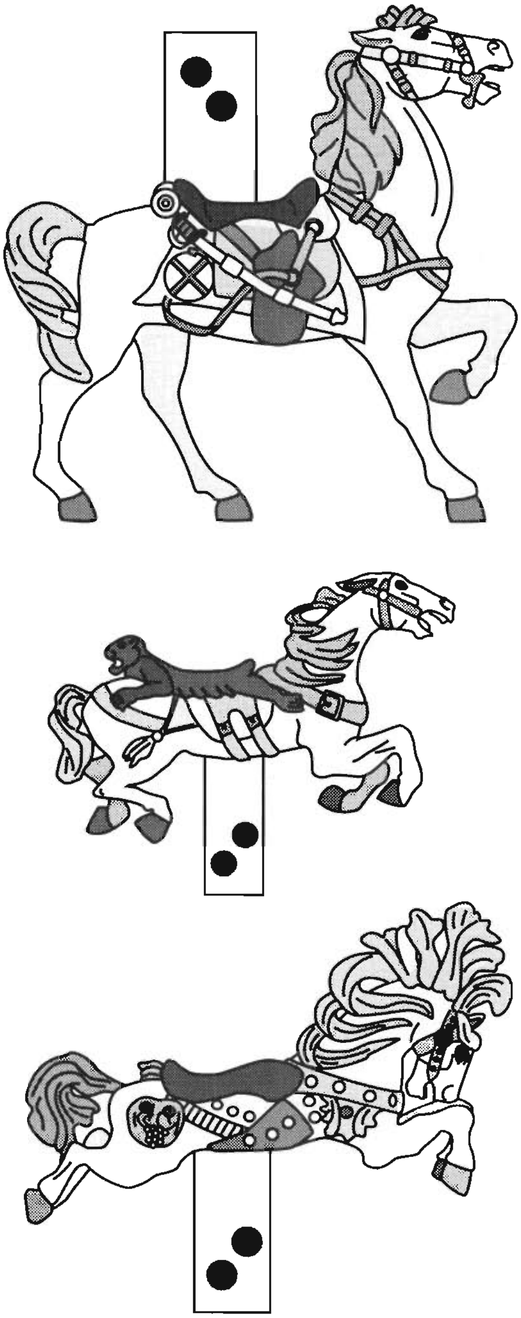


**Figure 1. Location of Holding Tabs**

Fraley and Gary Sinick.

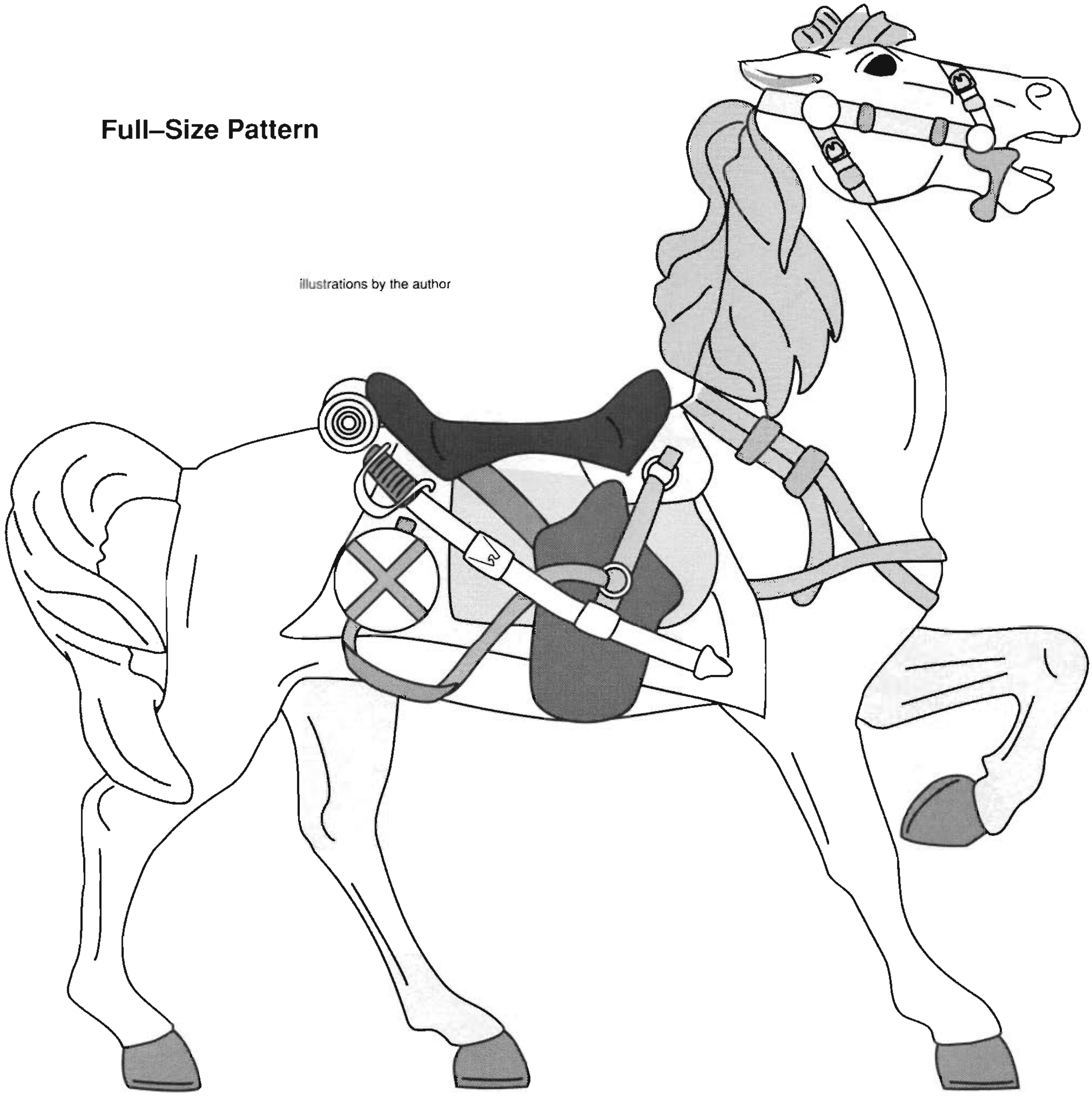
The characteristics to note in the carving of this horse are the typical pompadour that Mueller used for the forelock and the Civil War McClelland saddle with traditional cavalry tack. The horse is anatomically correct, so be sure to put in all the muscles properly.

One thing to note in the carving is that this horse has a very slight tilt to the head which cannot be shown adequately in the pattern. Be sure to put this in, since no matter how subtle, it greatly enhances the appeal of the carving. Nothing is worse than a figure that is completely symmetric. The head should tilt toward the romance side, and carve the eye as though the horse is looking at the rider. A more detailed and enlarged drawing of his head is given in Figure 2. This drawing identifies and emphasizes some of the anatomical features that should be carved to enhance your horse. These details can be used as a reference for the other two horses.

"Military Mueller" is held to its base by small dowels in each of the three standing legs. Drill holes for these before carving the legs. Then glue a dowel into the hoofs after the carving has been completed. Don't glue the dowels into the base because wood movement might break your horse. The dowels should

**Full–Size Pattern**

illustrations by the author



"Military Mueller" – Daniel Mueller, 1924 illustrations by the author

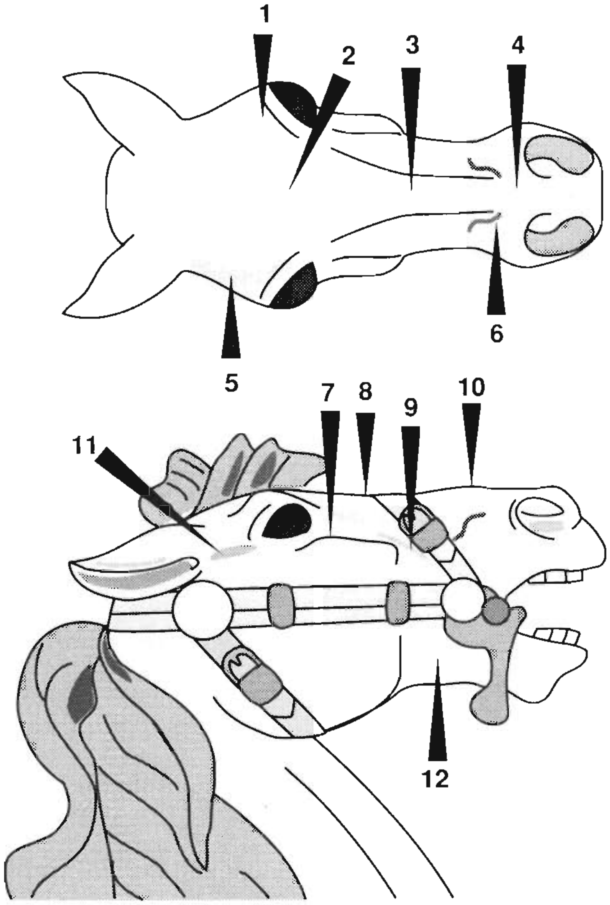
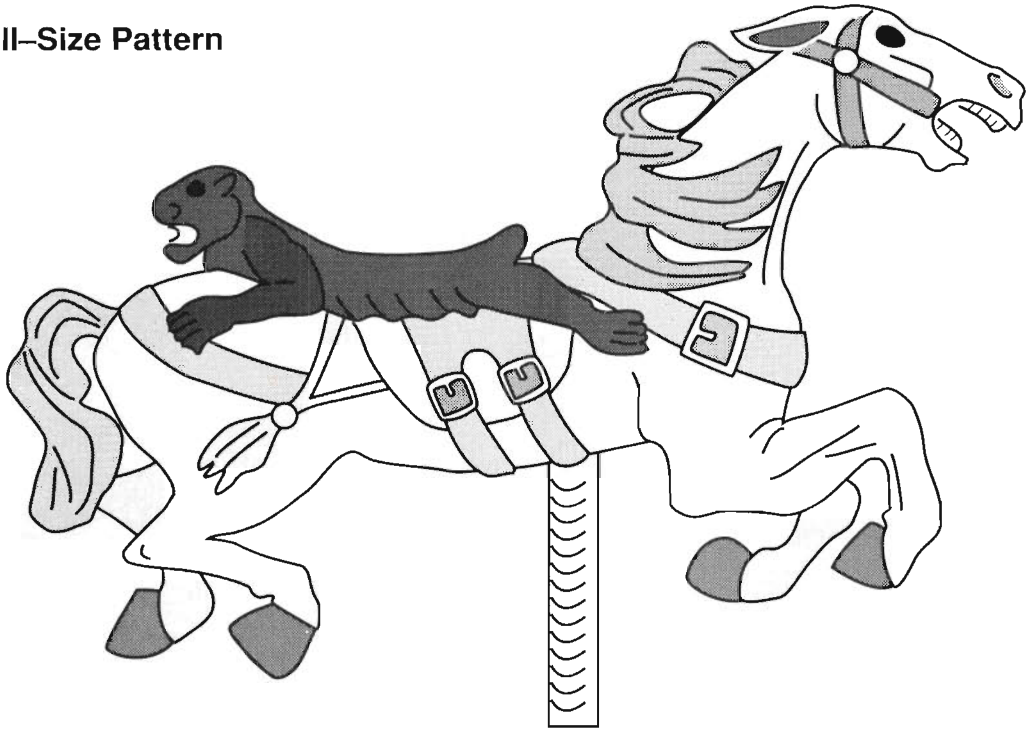


**Figure 2. Facial Features**

**Legend**

1. Cylindrical muscle region above eye
2. Triangular frontal bone
3. Groove
4. Triangular depression
5. Zygomaticus muscle
6. Facial vein
7. Masseteric ridge
8. Facial dish
9. Levator muscle
10. Nasal peak
11. Zygomatic arch
12. Depressor muscle

**Full–Size Pattern**



**"Bubbles" – Stein & Goldstein,1908**

extend at least 1/2" below the hoof.

## Coney Island Style

These animals displayed the flamboyance and glitter of Coney Island, which was the entertainment center of the East at that time. The animals on these carousels had exaggerated features and were trimmed with gold leaf and jewels. On your scaled miniatures, you can use costume jewelry to decorate your animals.

Our example of this style is the horse known as "Bubbles," which was produced by the company of Stein and Goldstein. Solomon Stein and Harry Goldstein were immigrants from Russia who started out in this country carving ladies' wooden combs. When they shifted to carousels they both carved their own animals. Their company lasted only until 1918. Many of their horses are reminiscent of the heavy-boned chargers that bore knights during the Middle Ages and were adorned with armor. Other horses like "Bubbles" portrayed aggressive animals carved in a running-free style. One version of this horse can be found on page 148 of *Painted Ponies* by William Manns and Peggy Shank.

This horse is characterized by a long neck and a growling leopard skin laid over the saddle. Both the horse's head and that of the leopard are turned outward (towards the romance side). Note the orientation of the very definite tilt to the head. Be sure to block it out carefully before carving and don't cut the mouth open while bandsawing. It should not be carved until the head has been formed so that the proper tilt can be attained.

## Country Fair Style

The animals carved in the Country Fair style have a definitive folk art look; they were generally smaller, and were designed to be used on the traveling carousels. This style originated in upstate New York near North Tonowanda with Allan Herschell whose company made "Rosebud," the horse that was the subject of last issue's column. "Lillie Belle", who also represents this style, was made by the C.W. Parker Company and was one of their most admired carvings. A photo reference for this horse can be found on page 105 of *Art of the Carousel* by Charlotte Dinger.

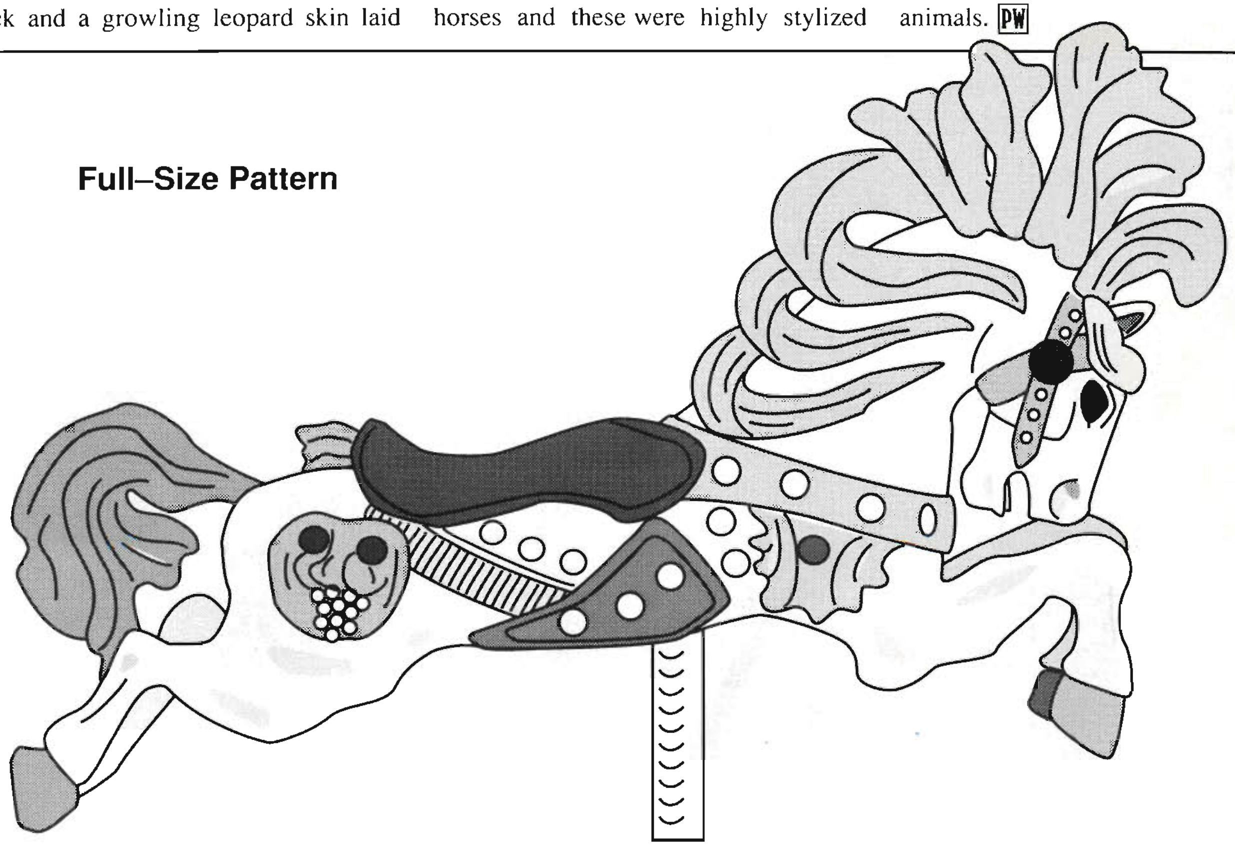
The Parker Company, established in 1892, was located in Abilene, Kansas and offered the first real competition to the Eastern companies. They made only horses and these were highly stylized and adorned with Americana of the Midwest. Their horses used extended running positions with nostrils flaring and open flowing manes. One of the stories associated with the Parker factory was that President Dwight Eisenhower worked as a sander for the company when he was a teenager.

Our horse, "Lillie Belle," is characterized by her long body and very stylized flying mane. This is a pierced design with the individual bunches of hair carved to look like flames on a burning log. The pose, known as the flying gallop, has both the front and back legs extended. In this particular case both sets of legs are carved in the same pose.

The saddle bag hanging behind the saddle is adorned with grape leaves and grapes. There is also a leaf decoration under the cantle. Use colored rhinestones for the jewels adorning her trappings. This carving has many openings to drill out before carving; be sure to drill undersized, to leave room for the carving.

With these four horses, you have a good start on a nice carousel carving collection. In the next issue we will present the patterns for some of the menagerie animals. PW

**Full–Size Pattern**



**"Lillie Belle" – C. W. Parker, 1914**

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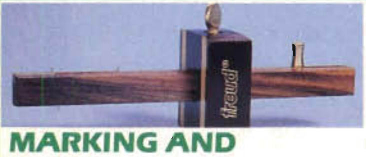

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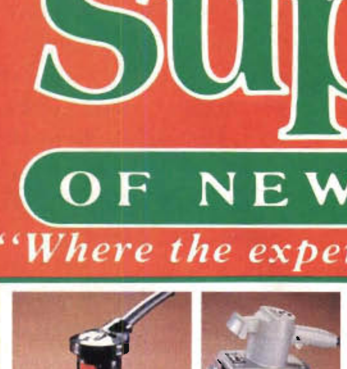

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## The Turner's Page

# Yo-Yo

### by John A. Nelson

Here is a classic toy to make for your son or daughter—and one that's not made of plastic as most are today. Commercial yo–yos are made of three pieces; this one is turned from only one piece.

Not being a yo–yo expert, I would suspect you could modify this design slightly and experiment with the many variables. After I built this one, I found myself wondering if it would function better if the center shaft was increased somewhat from the 5/16" diameter to perhaps 1/2" diameter or larger. Perhaps the outside 2-1/2" diameter could be reduced to 1-3/4" or so.

Either way, this makes an interesting woodturning project. You can paint it with colors and designs of your choice.

The yo–yo requires a blank 2-3/4" thick × 3" square, and it is simply turned between centers. Using a parting tool, cut the groove for the string. Taper the gap between inside surfaces of the groove from 1/4" down to 1/8" as shown.

To add the detail on the edge of the yo–yo, use the corner of a tool to make a thin groove. Take a two–foot length of wire and hold it into the groove until it gets hot and burns the groove. This technique adds a nice effect and can be used in many other woodturning projects you do.

Paint the yo–yo any design you wish or use a clear finish. The illustrated design is only a suggestion. Lay it out with a compass. Add a coat of high–gloss varnish over the entire yo–yo before you add the string.

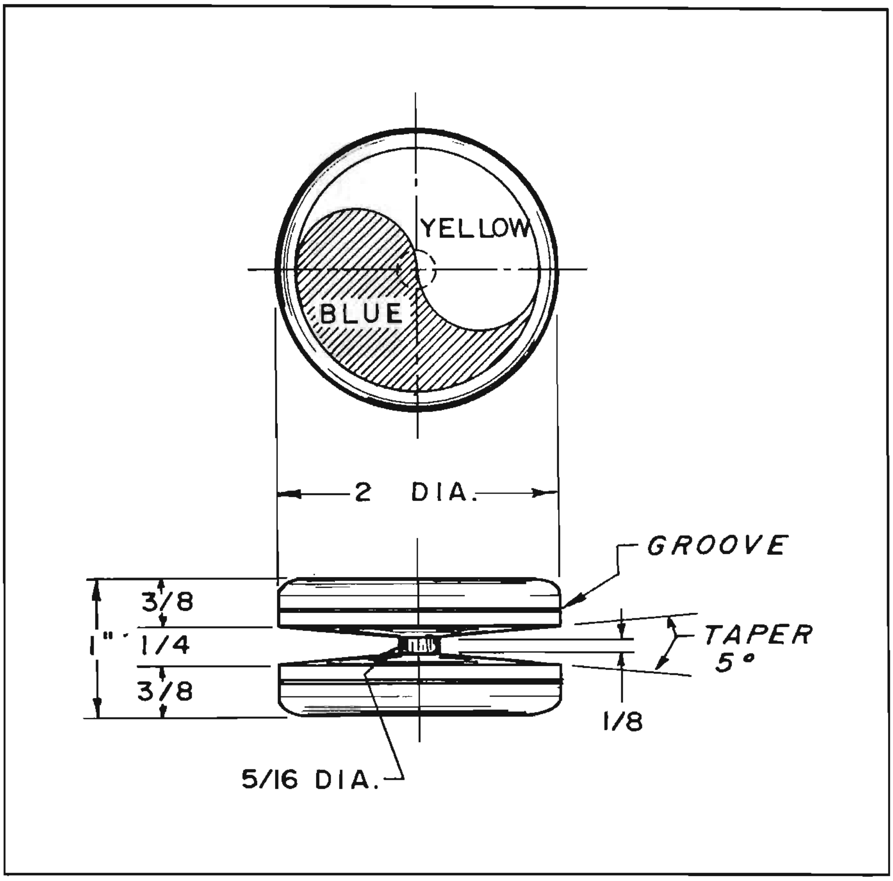
Drill a 1/16" diameter hole through the center 5/16" diameter shaft. You might want to experiment with different kinds and thicknesses of string—I found that some strings worked better than others did.

Now you can be the "yo–yo man" in your town! PW

---

*John A. Nelson is a woodworker and drafting instructor from Peterborough, New Hampshire, and the author of* How to Build a Grandfather Clock *(TAB Books, Monterey Lane, Blue Ridge Summit, PA 17214).*

Deborah Porter



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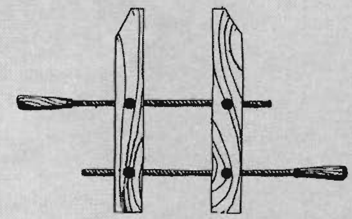


# Out of the Woodwork

**by Bob Laney**

## Packratting

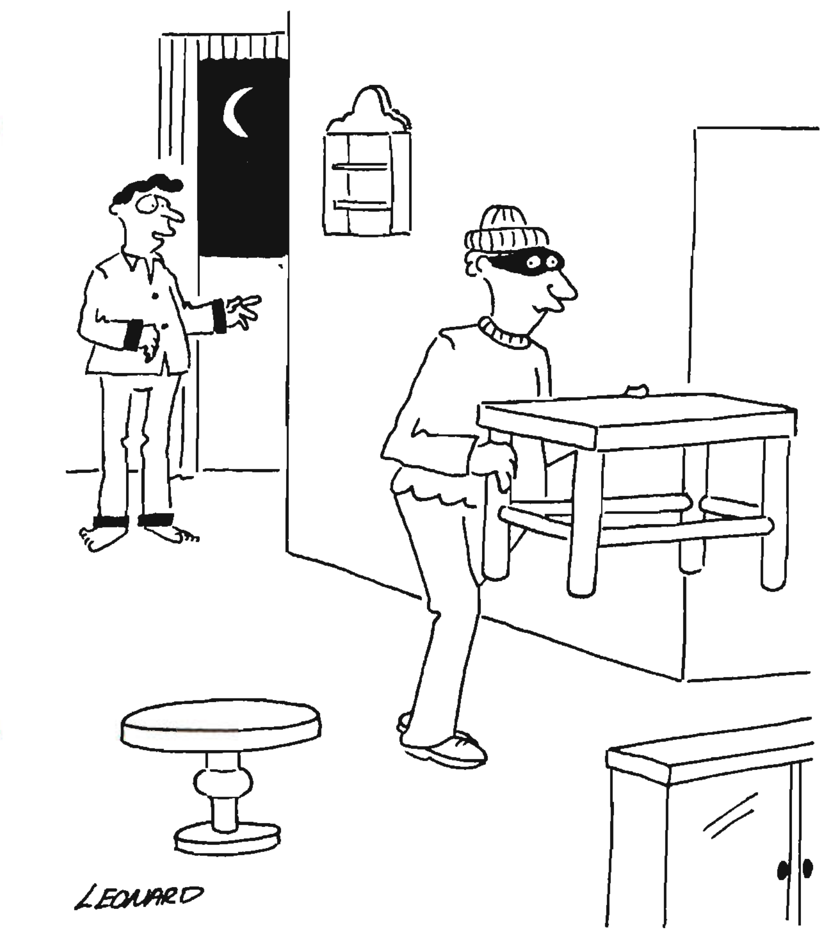
I recently ran across an article in a magazine on the phenomenon of packratting—the tendency of some people to acquire and stockpile items which may or not have value, in quantities beyond reasonable amounts. When I showed this to my wife, she suggested, not subtly, that woodworkers may be prone to the temptation to packrat much the same way that those who work in bars are subject to the temptation to drink (and all too often succumb). Upon further discussion, it became clear that she actually felt that *I* could be described as one afflicted with this tendency, and furthermore, that the state of my shop attested to this fact.

Upon hearing this, I was stunned. I immediately took my wife on a tour of my shop, with the intention of dispelling the notion that I could possibly be described as one with the packrat virus. I now take you on this same tour, knowing that an audience of woodworkers is bound to be more knowledgeable and understanding than she was.

***Bob Laney** is a woodworker in Hendersonville, North Carolina.*

The first thing we come across as we enter is the pile of 1 × 8's in the middle of the floor. These are not only carefully stickered and supported off the floor, but are also of obvious value and not really in the way once you get used to stepping over them. I must admit that the lumber rack, where these pieces might have gone, is full of what some might view as an odd collection of bits and pieces, but these too have obvious value to the trained eye.

Looking up, we see the maple branches left from pruning the season before last; these will go with the pieces of carbon steel in the box behind the metalworking vise to make some neat carving tools when I get the chance.



**"Oh well, I wanted to build some more furniture anyway..."**

Now, here is some good spare door hardware. Over the years I've replaced numerous locks for friends, relatives, and myself. These strike plates are good brass-plated steel; try buying just a strike plate sometime!

That box under the bench is a quarter-gross of English Whitworth bolts complete with nuts which once secured motorcycles in their shipping crates. These, believe it or not, were going to be simply thrown out by a motorcycle dealer when I came across them! That was twenty years ago, and I've already used three of them in a jig I built a few years back.

That's the chassis of a riding lawnmower back there at the rear of the shop. All it needs are some wheels to make it a sturdy shop cart. Or perhaps the rear axle with its sprockets and bearings could be the basis for some clever home-engineered machine I could well get around to designing. I've had a number of ideas in the seven years since I got it.

Some people actually toss out plywood cutoffs. I'm not talking about quarter sheets and the like; even the dullest imagination could see possible uses for large, regularly shaped pieces. It takes real creativity, however, to see to what use a piece of 1/2" CDX, shaped like Brazil or some internal organ, could be put someday.

Here are some containers that hardware and tools came in. That's pipe and angle stock overhead. I don't like to brag, but I spent a day-and-a-half designing the brackets that hold those short pieces of pipe and L-metal between the joists. It was tricky, especially trapping the ones less than a foot long.

So, as you can see, everything in my shop has a clearly designated use, and I could hardly be described as a packrat. When dealing with non-woodworkers, though, I've decided it's wiser not to call attention to cleverly salvaged items until they're put to use; otherwise, they are too often seen as mere junk by those lacking imagination and foresight. It is this lack, I believe, that has given rise to the packrat myth. **PW**

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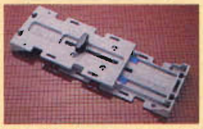

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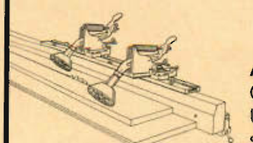

Sold elsewhere for $89.95

**MODEL G1630**

**$49.95** Prepaid to you

**ALSO AVAILABLE: Model G1578** Green shophelpers for shapers! Used as hold downs, these green shop helpers are very popular with shaper owners.

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***Price Breakthrough!***

### DOWELLING JIG

You've read about it, you've heard about it— THIS IS ONE DYNAMITE JIG!

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**MODEL G1662**

**ONLY $34.95**

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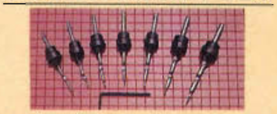
### 7-PC. TAPERED COUNTERSINK SET



Predrill holes for woodscrews easily and correctly the first time! This very high quality set is made in Japan.

**MODEL G1728**

**$39.95** Prepaid To You

We have the most courteous operators and the fastest shipping crew in the world! You place the order and before you hang up the phone, UPS is knocking on your door — well almost!

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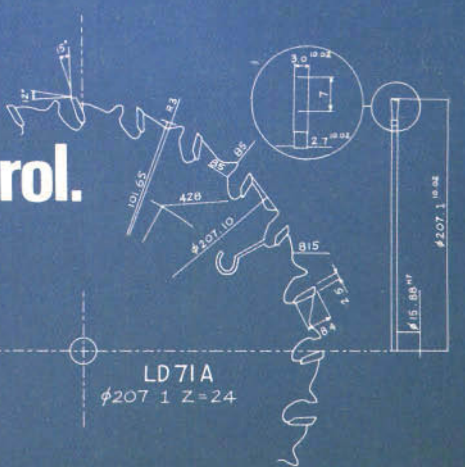
89-106

# New Safety Dado

## Improved Design. Effective Control.



### The Freud Difference

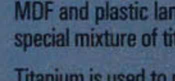
**Advanced CAD System.** The Computer-Aided Design System simulates actual cutting conditions in three dimensions and records the blade performance. This allows Freud engineers to electronically vary the material being cut and the blade's physical characteristics, developing saw blades that provide optimum cutting performance.

**Laser Technology.** A computer-controlled, 500-watt laser is used in the production of Freud cutting tools. The concentrated beam of light creates a perfectly round blade, produces shoulders identical in shape and size, and precisely centers the arbor hole. In addition, expansion slots are strategically placed to allow for heat dissipation during brazing and blade body expansion during actual use.

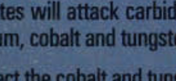
**Superior Carbide.** The chemicals used to produce and bond materials like composition boards, melamine, MDF and plastic laminates will attack carbide and cause it to corrode. Freud's engineers developed a special mixture of titanium, cobalt and tungsten carbide to significantly reduce this corrosive problem.

Titanium is used to protect the cobalt and tungsten carbide from chemical corrosion, ensuring a longer lasting carbide edge.

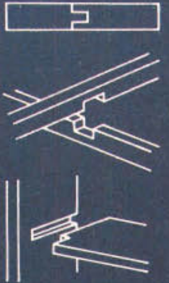
The right degree of hardness is another important property of carbide life. This difficult problem is solved by using carbon and tungsten powders with a grain size of 0.8 microns. Freud carbide is 33% more dense than the standard 1.2 micron size found in the carbide of other manufacturers.

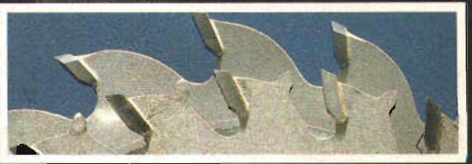


**Freud Micrograin Carbide**



**Standard Carbide**





**Old shoulder style (behind) compared to new safety shoulder style (front)**

### Freud Dado Head Puts You in Control.

The secret is the shoulder. It is in front of every tooth and it limits the tooth's bite. Since each tooth removes a very small chip (.2mm), you are in control. There is almost no climbing. Almost no chance of kickback. This is the key to a safer dadoing experience.

Freud's improved dado head does not compromise results either! It cuts a smooth square bottom. The tear-out is virtually non-existent, even when dadoing problem materials. Get control of your work, put Freud's new dado head on your saw!

| Stock Number | Diameter | Teeth | Max. Groove | Inside Chippers |
|---|---|---|---|---|
| SD 306 | 6 inches | 24 | 13/16" | (4) 1/8" & (1) 1/16" |
| SD 308 | 8 inches | 24 | 13/16" | (4) 1/8" & (1) 1/16" |
| SD 310 | 10 inches | 36 | 13/16" | (4) 1/8" & (1) 1/16" |
| SD 312 | 12 inches | 36 | 13/16" | (4) 1/8" & (1) 1/16" |

**Call for the name of your local distributor.**

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**Makes radial arm saw dadoing safer**

**Storage case comes standard**